A cluster analysis exploring youth welfare and justice histories linked to later offending

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Abstract

The first aim of this thesis was to investigate the possible existence of subgroups within a Child, Youth and Family dataset based on known risk factors for recidivism using exploratory cluster analysis. A second aim was to examine any association between cluster group membership and later offending (between the years 2003 and 2018) using follow-up conviction data obtained from the Ministry of Justice. The third aim was to ascertain if subgroups identified in this study would bear similarities to the risk groups identified by the McKinlay, James and Grace (2013) study. The dataset contained all New Zealand youths who received a youth justice intake during 2002 (N = 4,307). Exploratory cluster analyses identified 11 variables relating to care and protection and youth justice and K-means clustering identified a four-cluster solution. Cluster one had highest number of females and more likely to have a care and protection intake and little prior offending. Cluster two were prior offenders but not as high risk as cluster four and had little care and protection history. Cluster three had little care and protection and prior youth justice histories and were the largest group. Cluster four was the highest risk, early onset and repeat offenders. Understanding how the care and protection and youth justice histories of children and adolescents cluster together, allows the targeting of programmes to highest needs.

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Chapter One

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This chapter will first review the literature, related to youth offending, by discussing the costs associated with antisocial behaviour, developmental theories, risk and protective factors, the risk, need, responsivity model and approaches used to address antisocial behaviour in children and adolescents. Next an introduction to the dataset utilised by the current research and findings from the previous research using this dataset, will be provided. Finally, the aim of the current research will be presented.

1.1 The Costs Associated with Crime

There is a high cost associated with youth offending. Losel and Farrington (2012) suggest this cost is of concern in many countries worldwide, particularly regarding the best way to address it. These authors have highlighted how offending not only creates problems for the victims, but for the offenders and their families, the wider community, such as schools and neighbourhoods, and for governments, who must fund measures to address prevention, intervention and punishment.

Costs associated with crime can be classed as tangible or intangible (Farrington & Koegl, 2015). Tangible costs have a monetary value and are calculated using data provided by systems such as, medical, police, courts, prisons and insurance companies. Intangible costs are those viewed as reducing an individual's quality of life through any action that causes lasting distress (Welsh, Loeber, Stevens, Stouthamer-Loeber, Cohen & Farrington, 2008). It has been suggested that "intangible" costs are overvalued in many studies, due to data from expensive civil claims being used in calculations. Civil claims bear little relevance to the types of crime they are supposed to represent; therefore, more relevant data should be used when undertaking a cost-benefit analysis (Tonry, 2015). While some studies acknowledge the costs of crime borne by

people other than victims (Welsh et al. 2008), there has been criticism that most studies ignore the costs to the perpetrator of the crime and their family. Many families suffer significant costs, for instance, a lower quality of life due to factors such as, the decrease in family income and support, through to the higher risk for future offending for children who have a parent in prison (Tonry, 2015).

It is important to understand the financial burden of offending when developing policies and programmes designed to prevent or intervene when antisocial behaviour occurs (Wickramasekera, Wright, Elsey, Murray & Tubeuf, 2015). Having knowledge relating to the costs connected to the different types of crime provides information allowing investment in prevention, intervention and punishment to be targeted at those crimes with the highest costs, whether these are tangible or intangible (Albertson & Fox, 2008). Cost-benefit studies of programmes designed to address offending and recidivism can be used to assess whether savings due to a reduction in offending, as a result of these programmes, exceeds the costs to run them (Wickramasekera et al., 2015). Cost-benefit analyses of prevention and intervention programmes to address youth offending, have found not only a reduction in costs due to less crime, but also due to lower costs to the welfare and health systems (Welsh et al., 2008).

Researchers use bottom-up and top-down methods to determine the cost of crime (Farrington & Koegl, 2015). Bottom-up methods utilise systems data, for instance police, courts, prison or medical, and top-down methods survey populations on their willingness to pay for prevention, intervention or punishment, to deter crime (Farrington & Koegl, 2015). Calculating the cost of crime from the bottom-up is not an exact science however, due to difficulties experienced when considering all possible costs. Not all crime is reported or prosecuted, there can be a lack of access to all relevant data and it is difficult to know or predict the impact and costs of crime over time (Welsh et al., 2008; Wickramasekera et al., 2015). Cohen, Rust and Steen (2006) conducted their willingness-to-pay study to highlight the inadequacies of opinion

polls, which ask the public for their views on how to address crime. The favoured response is to get tough on crime, usually through harsher sentencing laws. These polls usually fail to ask the public how these tougher measures are to be financed, which areas (e.g. health, education) should receive less funding in response to re-directing finance to crime, and therefore provides limited assistance to policy makers. The results of the Cohen et al. (2006) study demonstrated there was a reluctance to spend more money building prisons, when the money could be allocated to programmes addressing youth crime, drug addiction or for better policing. These were the preferred responses, even when a tax rebate was offered, however, in the absence of other choices, the tax rebate was preferable to building more prisons.

To understand the costs incurred by the most prolific serious offenders, Welsh et al. (2008) utilised data from the Pittsburgh Youth Study. They selected data for the youngest cohort of boys (n = 503) who were aged 7 years old when the study began in 1986. Half of this cohort were boys considered high risk with the other half considered low to medium risk. Self-reported offending data was gathered until the cohort was 17 years of age. The researchers estimated the total costs of offending by this cohort to be between US$89 - $110 million over this 10-year period. Cohen and Piquero (2009) estimated that if a 14-year-old high risk youth could be diverted from long-term offending, the value gained would be between US$2.6 and $5.3 million. Due to much of the research relating to costs of crime being undertaken in the United States and United Kingdom, Allard, Stewart, Smith, Dennison, Chrzanowski and Thompson (2014) sought to understand costs as they applied to Australian offending. Data from the Queensland Longitudinal Database containing 41,377 people born during 1983 and 1984 and who had committed an offence in Queensland between the ages of 10-25 years was utilised. The findings from this research revealed that while only 4.8% of the cohort were chronic offenders, they created 41.1% of the total costs. By the time each chronic offender had reached the age of 26 years they had accrued costs between A$186,366 and A$262,799 on average, with 60%

attributed to criminal justice costs. The New Zealand Treasury carried out an analysis looking at the cost of crime within New Zealand, estimating total costs for all crime during 2003/04 to be NZ$9.1 billion (Roper & Thompson, 2006).

Research clearly shows there is a high cost to society resulting from crime, however it is not enough to only understand what the costs are, it is also critical to understand the developmental trajectories of crime, which will be discussed next.

1.2 Developmental Theories of Crime

Emerging in response to the failure of existing theories of criminal behaviour to explain anti-social behaviour across the life-course, developmental theories endeavoured to provide more information regarding factors such as onset, frequency, persistence and desistance of offending (Piquero, Farrington, Blumstein, 2003). The two main ideas underpinning life-course research are trajectories and transitions. Trajectories take a long-term view of development across a life time, suggesting` that events experienced in childhood have an impact in adulthood. Transitions are the turning points that occur over a shorter period in life, altering the path taken on the trajectory. Trajectories and transitions in life-course research acknowledge that human behaviour can be both stable and changeable (Piquero et al., 2003).

One of the most replicated criminological findings is the age crime curve (Farrington, 1986; Gottfredson & Hirschi, 1983, 1990). Most research demonstrates that anti-social behaviour increases during adolescence, peaks around 17 years old, and begins to consistently decrease upon entering adulthood. While there is agreement regarding the age crime curve much debate surrounds the mechanism behind the distribution of the curve, which has generated a large body of research and differing developmental theories (Moffitt, 1993).

Moffitt's (1993) taxonomy of anti-social behaviour is one of the most influential developmental theories. Observing that the sharp downturn in antisocial behaviour from late

adolescence was matched by a sharp rise in antisocial behaviour beginning in childhood, Moffitt proposed two distinct groups of offenders, *life-course-persistent* (LCP) and *adolescent-limited* (AL). The pathway to LCP offending begins early in life when individual behavioural risk factors of the child are paired with a high-risk environment. Neurocognitive deficits (e.g. hyperactivity, a difficult temperament, reading difficulties, low intellectual ability) interact with environmental factors (e.g. harsh and inconsistent parenting, family conflict, multiple changes in guardianship, school difficulties), with the individual eventually developing a personality characterised as aggressive and anti-social. The theory suggests LCP offenders are a small group who begin early, offend into middle age, in more than one area of adult life (e.g. employment, family violence) and are more likely to commit serious and violent offences (Moffitt, 1993, 2007). Alternatively, AL anti-social behaviour appears with the emergence of puberty, when anti-social behaviour is observed at similar rates to LCP youth. These youth become more concerned with peer connection and gaining autonomy from parents, demonstrating rebellious and defiant behaviour, as they move towards adulthood. However, due to an absence of individual and environment risk factors, as seen in LCP offenders, AL youth desist during early adulthood, as they begin to focus on more conventional life goals. The theory predicts AL are more prevalent but temporary offenders whose offending is of a less serious nature (Moffitt, 1993, 2007). Moffitt cautioned that even if AL youth are responsible for less serious offending, the impact is still significant due to the size of this group. Additionally, moving on from anti-social behaviour may be impeded for AL youth if they experience situations described as *snares*, for instance an addiction or a criminal record.

Moffitt extended the theory to include a third group of offenders, named *low-level chronics*, in support of the replicated findings from other longitudinal studies, whose results consistently reported this third group (Nagin, Farrington & Moffitt, 1995; Fergusson, Horwood & Nagin, 2000). The original study had uncovered a small group of males that had the same

individual and environmental childhood risk factors as the LCP group, however, this smaller group participated in much lower levels of anti-social behaviour in adolescence, when compared to the LCP group. In the hope of finding protective factors that would divert youth away from the LCP pathway, this group had been named the "recovery group" (Moffitt, 2007). Motivated by the low-level chronic findings, the recovery group was followed up at age 26 and was found to resemble the low-level chronic group from previous research. Predicting this group had personal factors unappealing to others, that would exclude them from the usual anti-social adolescent peer groups, this group at age 26 were found to have few social connections, had never married, were unable to maintain employment, with high levels of mental health problems (Moffitt, Caspi, Harrington & Milne, 2002).

Adolescents who refrained completely from anti-social behaviour were thought to be rare. The non-offenders from the Dunedin Longitudinal Study cohort were found to have personalities that were more guarded and anxious than other groups, socially awkward and less sexually active but exceptional students at age 18 (Moffitt, Caspi, Dickson, Silva & Stanton, 1996). When the non-offending group were followed up at age 26, offending was rare, and the socially awkward teenagers had become successful adults, who were well educated with good career prospects, stable marriages but had delayed parenthood, and experiencing excellent mental health (Moffitt et al., 2002). Research has shown the development of antisocial behaviour is explained in males and females by Moffitt's taxonomy, with both sexes having the same childhood risk factors observed in the LCP offender (Fergusson et al., 2000; Moffitt & Caspi, 2001). Large differences are found in the number of males and females in the LCP group with a smaller difference found in the AL group. The ratio of males to females in the LCP group found in the Moffitt & Caspi (2001) study was 10:1, whereas the ratio for AL was 1.5:1.

Offering an alternative theory, Sampson and Laub (1993) argued that criminal behaviour persistence and desistence are (respectively) explained by either the lack of or presence of

informal social controls. The early engagement of children in antisocial behaviour reflects weak social bonds, predominantly with adults within the family and at school. Inadequate attachment to parents is thought to occur due to receiving discipline that is abusive, intimidating and inconsistent, with these children receiving limited parental supervision, thereby leading to antisocial behaviour. Acknowledging antisocial behaviour in childhood is connected to antisocial behaviour in adulthood, Sampson and Laub (1993) proposed that this occurs through a process they call *cumulative disadvantage*, whereby those who persistently offend have failed to encounter, at each stage of life, an opportunity to desist through the support offered by informal social controls.

An important feature of Sampson and Laub's (1993) theory of informal social control, is the ability of life experiences in adolescence and adulthood to either positively or negatively influence whether an individual will persist or desist in behaving antisocially, with this one theory having the ability to explain both pathways. With multiple pathways to desistance their theory argues that it is life transitions, such as marriage, employment or moving to a less crime prone neighbourhood that are involved in the process of desisting from crime. Strong adult bonds to marriage and employment predict individuals will be less likely to engage in criminal behaviour. Alternatively, persistent offenders are found to experience marriage, employment and housing impermanence, receive limited education and are imprisoned for longer durations than those who desist. Strong adult bonds to marriage, employment and community provide individuals with support, daily structure and an opportunity for growth, giving them a chance to begin over, rebuilding their identity.

Sampson and Laub (2003) revised their theory to include human agency as a factor promoting persistence or desistence, recognising that humans are not passive recipients of life's experiences and that individual choices are made. Viewing crime as rewarding for example, may influence the choice to persist with crime. Alternatively, factors such as seeking a different

pathway or opportunities for their families may influence an individual to make the choice to desist from crime.

In contrast to Moffitt's (1993) taxonomy, Sampson and Laub (2003) concluded that their theory offers little support to the idea that there are different offending trajectories with distinct pathways relating to onset, desistance, persistence and seriousness of crime. Furthermore, they expressed concern that Moffitt's taxonomy could be used to predict and intervene in the lives of children who appeared to possess attributes of LCP offenders as though it were a predetermined fact of future deviance, when findings from their own research suggested that eventually even those persistent offenders ceased their activity with age. In response to these concerns it was noted that Sampson and Laub's sample were more than likely to be LCP offenders, based on their participants histories, making it harder to distinguish any other groups (Moffitt, 2007; Walters, 2010). Moffitt (2007) provided further clarification, advising that those on the LCP pathway did not require criminal behaviour and arrest in advanced age in order to demonstrate being on the LCP pathway, however, those on the LCP pathway did continue to possess antisocial attitudes, values and behaviours affecting how they interacted with others as they aged, even once they had ceased offending. Developmental theories highlight that children and adolescents behaving antisocially is developmentally normative for many young people, however there are risk factors that increase the likelihood that antisocial behaviour will begin earlier in life and be of a more serious nature in some young people. Research regarding risk factors whether individual or environmental will be discussed next.

1.3 Risk and Protective Factors

Understanding the risk factors that contribute to antisocial behaviour in children and adolescents is essential for prevention and intervention strategies. Risk factors can be classed as either static, therefore unable to be changed (e.g. age at first offence) or dynamic (e.g. association with antisocial peers) with the possibility of change through the provision of an

intervention (Andrews & Bonta, 2010). Additionally, risk factors may be either a trait of the individual (e.g. impulsiveness, low intelligence) or an aspect of the individual's environment (e.g. family or neighbourhood dysfunction) that predicts the possibility of antisocial behaviour occurring and continuing over time (Losel & Farrington, 2012). Antisocial behaviour is not explained by any single risk factor alone but through an accumulative effect, where the more risk factors a child or adolescent is subject to the greater likelihood of antisocial behaviour with a higher risk of later violent offending (Herrenkohl, Maguin, Hill, Hawkins, Abbott & Catalano, 2000). Many children and adolescents with histories that might suggest a high risk of antisocial behaviour do not engage in serious delinquency, leading researchers to investigate potential protective factors (Losel & Farrington, 2012). Protective factors may be *direct*, indicating that the child or adolescent is low risk and unlikely to engage in antisocial behaviour over time, or they may be *buffering* suggesting the child or adolescent may not engage in antisocial behaviour despite the presence of risk factors (Losel & Farrington, 2012). The following is a brief review of risk and protective factors within the domains of: the individual, family, school, peers and community.

1.3.1 Individual

Being male carries a higher risk for serious antisocial behaviour than being female, with studies suggesting differences in how males and females manage conflict creates this risk (Andrews & Bonta, 2010). Typically, males are more likely to use physical force, whereas females tend to apply indirect and verbal methods, such as social alienation and the spreading of malicious rumours (Herrenkohl et al. 2000). An early onset of serious antisocial behaviour may predict later antisocial behaviour. Using data from the Christchurch Health and Development Study, Fergusson, Horwood and Ridder (2005) compared the top 5% most antisocial children from the cohort, when aged seven, to children who were not antisocial (50% of the cohort) on a range of outcome measures when aged 26. The results from this study showed there were

significant differences between the two groups. Thirty five percent of the antisocial group had committed violent offences compared to only 3% of the children who were not antisocial, 20% used illicit drugs compared to 5%, 52% had no school qualifications compared to 6% and 33% received government assistance compared to 9% (Fergusson et al., 2005).

Having a low resting heart rate is a physiological factor implicated as a risk for offending (Farrington, 1998). Under-arousal of the autonomic nervous system is thought to be the underlying mechanism behind this risk, creating behaviours such as, low fear, higher levels of boredom and an inability to learn from previous experience. To increase arousal these individuals are drawn to activities involving higher levels of risk and stimulation (Farrington, 1998; Portnoy & Farrington, 2015). Having a low resting heart rate at age 18 years, as measured for the Cambridge Study in Delinquent Development, was a significant indicator of continued antisocial behaviour up to age 50 years (Jennings, Piquero & Farrington, 2013).

Low IQ has been linked with a higher risk of antisocial behaviour in children and adolescents, particularly low verbal IQ, and low IQ has been associated with poor achievement at school (Farrington, 1998). Two separate theories explaining this link with IQ have been proposed. The first states that having a limited verbal ability creates difficulties for children when communicating in social situations, such as school, meaning they resort to aggression out of frustration and to try to control the interaction. The second theory suggests that low verbal IQ may signify an inability to retain instructions or to think through the outcome of behaviour, therefore leading to reduced behaviour management (Scott, 2015).

Aspects of personality and temperament that have consistently been found by research to heighten risk are hyperactivity, problems with attention, restlessness and impulsiveness (Farrington, 1998). Two different groups of children are found to engage in antisocial behaviour prior to adolescence. The first group displayed poor emotional self-regulation, was conscious of how their behaviour impacted others, were emotionally reactive to any perceived threat from

others and were more likely to come from dysfunctional families (Frick, 2012). In contrast, the second group showed an inability to empathise with others or to feel guilt which has been identified in a small subset of children, whose antisocial behaviour was also noted prior to adolescence. Children displaying callous-unemotional traits (CU) tend to show limited emotional capacity, except when used as a manipulative tool for personal benefit (Frick, 2012). These children were not responsive to signs of discomfort or suffering in others, were less responsive to the threat of punishment and were fearless showing little sign of anxiety. These factors disrupt the usual development of conscience and these CU children display a serious, hard to treat form of antisocial behaviour (Frick & Viding, 2009). Negative parenting practices are thought to be less connected with the CU trait compared to, other antisocial pathways (Frick, 2012).

Recently studies have begun to explore the link between nutrition and antisocial behaviour, as nutritional deficits have been shown to impair brain function which is involved in the regulation of behaviour (Newsome & Cullen, 2017). Research on children with behavioural difficulties and imprisoned adolescents and young adults, demonstrates that when given dietary supplements significant reductions in antisocial behaviour occurs (Raine, Portnoy, Liu, Mahoomed & Hibbeln, 2015; Schoenthaler, Amos, Doraz, Kelly, Muedeking & Wakefield, 1997; Zaalberg, Nijman, Bulten, Stroosma & van der Staak, 2010).

1.3.2 Family

Multiple family factors have been shown to influence the development of antisocial behaviour in children, ranging from parenting attitudes and behaviour, to conflict and abuse within the family. Inadequate family management practices increase the risk of antisocial behaviour in children and have been identified by research to be attributes of parenting such as, a lack of warmth and affection, high levels of criticism, aggressive and inconsistent discipline, a lack of rules governing expected behaviour and a lack of supervision and monitoring.

(Herrenkohl et al. 2000; Scott, 2015). Often these practices occur when parents react with annoyance to the child's behaviour, with the additional tendency to respond only to the negative behaviour and ignore any positive behaviour, thereby reinforcing (i.e. strengthening) the antisocial behaviour. Furthermore, antisocial behaviour is again reinforced when children learn that if they intensify their antisocial behaviour a parent will not follow through with a threatened punishment, teaching the child that there is a reward for behaving aggressively (Scott, 2015). A lack of parental involvement in the life of a child has been found to increase future antisocial behaviour but having parents, especially a father, involved in leisure pursuits with a son, has been found to be a protective factor (Hawkins, Herrenkohl, Farrington, Brewer, Catalano, Harachi, & Cothern, 2000). Healthy behavioural development requires parents to model prosocial behaviour not only through their parenting practices but also through the example of their own behaviour. Having parents who are involved in criminal activity or having a parent with a conviction, increases the risk for children and adolescents to engage in antisocial behaviour (Farrington, 1989; Hawkins et al. 2000). Parental gang membership and growing up identifying with gang culture may influence a young person's decision to join a gang during adolescence (Thornberry, Krohn, Lizotte, Smith & Tobin, 2003).

A family factor that has been studied extensively is the association between child maltreatment and future delinquent behaviour (Malvaso, Delfabbro & Day, 2016). Antisocial behaviour is observed earlier in children who have experienced maltreatment (Rivera & Widom, 1990) and as adults they are more inclined to commit violent crime when compared to children who have not experienced maltreatment (Langford, Miller-Johnson, Berlin, Dodge, Bates &Pettit, 2007). Such research has demonstrated, however, that not all maltreated children engage in later delinquent behaviour (Widom & Maxfield, 1996) and there are complex pathways from child maltreatment to later delinquent behaviour (Malvaso et al., 2016). Many studies have investigated the type of maltreatment (e.g., emotional, physical or sexual abuse or neglect) and

the contribution to later offending. A consistent finding of these studies being a strong link between physical abuse and neglect with later offending (Maxfield, Weiler, & Widom, 2000; Mersky & Reynolds, 2007). Research by Widom and Ames (1994) initially suggested that being a victim of physical abuse, sexual abuse and neglect during early adulthood increased the risk of sexual offending, however, when Widom and Massey (2015) extended this research to outcomes in later adulthood they found only physical abuse and neglect were related to a higher risk of sexual offences. Researchers have investigated the cumulative effect of maltreatment in relation to offending, for example, being victim to multiple types of maltreatment with a high number of these abuses being reported over time (Malvaso et al., 2016). While some studies found increased risk for delinquent behaviour based on cumulative maltreatment (Ryan & Testa, 2005), others found that cumulative maltreatment was not a risk factor for violent offending (Jonson-Reid, Kohl & Drake, 2012). Lemmon's (2006) study found that cumulative maltreatment was a risk for offending and recidivism, however, the risk was reduced by children being placed in out of home care. Studies examining the influence of being placed in care outside of the family home due to maltreatment, on later offending, have had conflicting results. The most consistent findings have indicated a higher likelihood of offending if the out of home placement occurs at an older age and if there were multiple placement changes occur (DeGue & Widom, 2009; Ryan, Hong, Hertz & Hernandez, 2010). Childhood is a critical stage of development with significant deficits caused by any factor that interrupts healthy developmental processes. Chen, Propp, deLara and Corvo's (2011) research into the impact of childhood neglect, found that neglect had ongoing negative effects on cognitive performance leading to poorer academic achievement, and caused neurological deficits that reduced executive functioning (e.g. attention, planning, task focussed). Chen et al. (2011) also found that children who experienced neglect from an early age were more likely to commit violent offences and have drug and alcohol problems during adolescence and early adulthood, however, this connection between substance abuse and neglect was higher if the child had also witnessed domestic abuse in the home. Bender (2010) also

argues there are complex pathways between experiencing maltreatment as a child and later offending and proposed five factors that could potentially influence this connection: the vulnerabilities caused by having to leave the home (e.g. running away or foster care); mental health problems which are found in a significant proportion of the offending population; substance abuse problems; the inability to continue with education; and exposure to antisocial peers.

Gender differences have been noted and Jung, Herrenkohl, Lee, Hemphill, Heerde & Skinner (2017) investigated how internalising (e.g. social withdrawal, anxiety) and externalising (e.g. fighting, vandalism) behaviours observed in school children, who had experienced maltreatment, related to later offending. Internalising behaviour observed during the school years was found to be predictive of later offending among females, but not males. By contrast male offending was predicted by externalising behaviour observed during the school years, while female offending was not. Jung et al. (2017) suggested that internalising behaviour had a protective function for males, possibly as a result of less exposure to negative peer influence due to these males being more socially reserved.

Negative parenting and maltreatment experienced by children has been theorised to create a disorganised attachment pattern, meaning individuals struggle to maintain healthy relationships. (Bowlby, 2005). In a meta-analysis Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley and Roisman (2010) found a significant effect $d = 0.58$ demonstrating that there is a connection between having a disorganised attachment style and antisocial behaviour. In contrast, having a secure attachment with parents has been found to be both a direct protective factor and to provide a buffering effect when other risk factors are present (Losel & Farrington, 2012). A healthy relationship with parents enables the development of stable emotional regulation skills and prosocial behaviour and has been found to counter any negative influence from peers (Scott, Briskman, Woolgar, Humayun, & O'Connor, (2011).

1.3.3 School

A range of factors associated with the school experience have been identified as contributing to the risk of antisocial behaviour. Alongside family, school provides further opportunities for socialisation (McAra & McVie, 2010). Children who have limited interest in attending school and fail to achieve academically are at higher risk of truancy and leaving school without qualifications, additionally placing them at higher risk of keeping company with antisocial peers. Research suggests truancy, leaving school without qualifications and associating with antisocial peers places young people at higher risk of behaving antisocially (Herrenkohl et al., 2000). A study by McAra and McVie (2016), using data from the Edinburgh Study of Youth Transitions and Crime, found that adolescents who were engaging in antisocial behaviour often experienced major relationship difficulties with parents and a lack of parental supervision, which in turn influenced their attitudes to school. These adolescents shared that they thought school held little purpose for them therefore they did not think attendance was important. Alternatively, adolescents who reported finding school rewarding and who experienced stable relationships with parents, had a much lower risk of antisocial behaviour McAra and McVie (2016). Having future education goals during late adolescence was found by Dubow, Huesmann, Boxer and Smith (2016) to be a protective factor, that reduced the risk of behaving violently as an adult. Risk factors that predict antisocial behaviour such as low academic performance, suspensions and leaving school early without qualifications have been found to be higher in students from low socioeconomic backgrounds, however, Garmezy (1991) has suggested that these risks may be due to other factors found in low socioeconomic areas, for instance, belonging to a single parent family, poor health, inadequate nutrition and developmental delays. A study by Christle, Jolivette and Nelson, (2005) demonstrated that other school-related factors may contribute to poorer educational outcomes for students from lower

socioeconomic backgrounds, finding these students are often subject to bias from school staff, who may have lower academic expectations of poorer students.

Research has also highlighted that attributes of the school environment may impact risk for antisocial behaviour. School zoning practices, for example, have been found to be associated with the different rates of antisocial children found at different schools, such that schools with a high percentage of antisocial children may reflect the community they serve (Murray & Farrington, 2010). Christle et al. (2005) highlighted how the school environment, staff attitudes and skill level influenced the behaviour of students from high risk backgrounds. In schools considered high risk experiencing high levels of antisocial behaviour, staff attitudes were found to be overly negative towards students, their families and the school itself, with little expectation of improvements in school involvement, the behaviour or academic achievement of students or the teachers working conditions. Staff were found to limit their interactions with students, used few educational strategies and employed punitive measures to control behaviour, thus creating a tense atmosphere at these schools. The maintenance of school buildings was found to be low, adding to this unattractive environment. Alternatively, Christle et al., found schools with students from high risk backgrounds were able to be a positive influence by employing teachers skilled in the utilisation of educational, relationship building, and behaviour management strategies.

1.3.4 Peer

As noted by Scott (2015) a consistent finding of developmental research is that antisocial children and adolescents tend to have relationship difficulties with peers marked by high levels of confrontation and children and adolescents who do not behave antisocially tend to avoid associating with these antisocial children. Having antisocial peers during adolescence is highly predictive of antisocial behaviour (Moffitt, 1993) with adolescents unlikely to commit an antisocial act alone or in a large group; the more common tendency is for two or three

adolescents to carry out antisocial behaviour together (Murray & Farrington, 2010). A circular effect has been demonstrated, in which having antisocial peers produces further antisocial behaviour and being antisocial creates the likelihood of associating with delinquent peers, potentially resulting from the abandonment and censure from more prosocial individuals (Murray & Farrington, 2010). McAra and McVie (2016) found that young males who experienced repeated negative early life factors, such as, multiple adverse experiences over a long period of time, being victims of crime themselves and suffering ongoing harassment from adults, were more likely to be at risk for future violent behaviour than those who displayed an early onset of antisocial behaviour. They suggested the reason for this finding could be that highly victimised males use violence to retain their standing within their peer groups, to regain power and to inform their identity.

Young people affiliated with gangs commit a significant proportion of criminal acts, including serious offences (Chu, Daffern, Thomas & Lim, 2012). Associating with delinquent peers increases the risk for offending, nonetheless gang affiliation has been found to be even more predictive of offending behaviour than having antisocial peers alone (Battin, Hill, Abbott, Catalano, & Hawkins, 1998). The Pittsburgh Youth study demonstrated this by finding increases in drug, property and violent offending and an increase in the use of drugs when young males joined a gang, however, on exiting the gang rates of offending returned to lower rates than had been seen prior (Gordon, Lahey, Kawai, Loeber, Stouthamer-Loeber & Farrington, 2004).

1.3.5 Community

Socially disorganised communities have been defined as those with higher rates of crime, easy availability of drugs, substandard housing and high residential turnover that creates low community attachment (Murray & Farrington, 2010). Herrenkohl et al. (2000) analysed data from the Seattle Social Development Project, which measured potential risk factors when children were aged 10, 14 and 16 that might predict violent behaviour at age18. They found that

living in communities where a high proportion of adults were involved in criminal behaviour, with easy availability of drugs, and high levels of social disorganisation carried a significant risk for offending at age 18. They suggested that programmes aimed at increasing a sense of community, raising the standard of community housing, and finding ways to increase supervision of young people, would lower the risk of youth violence by inhibiting the factors that lead to social disorganisation. Results from the Pittsburgh Youth Study showed and interesting relationship between risk of antisocial behaviour and the type of neighbourhood inhabited, finding that boys with the highest risk scores were more likely to behave antisocially regardless of the type of neighbourhood inhabited. However, boys who had low risk and many protective factors were found to be at increased risk of later offending when living in disadvantaged neighbourhoods (Wikstrom & Loeber, 2000).

An understanding of the risk factors leading to antisocial behaviour is one component of the framework necessary to address offending and recidivism. The full framework will be discussed next.

1.4 A Theoretical Framework to Address Offending

A framework provides an understanding of the factors contributing to the development of antisocial behaviour and informs assessment and treatment, with the aim of replacing antisocial behaviour with more prosocial behaviour to reduce recidivism (Hoge, 2016). The most widely used framework in the offending rehabilitation field is the Risk, Need, and Responsivity Model (RNR; Andrews & Bonta, 2010) which will be discussed below in further detail.

The RNR model, based on a general personality and cognitive social learning theory, was originally conceived of by Andrews, Bonta and Hoge (1990), and further developed by Andrews and Bonta (2010). The purpose of this model is to address accountability and rehabilitation concerns by utilising risk assessment tools and risk management practices (Hoge, 2016). Initially designed for adult offenders it has been expanded to include application to adolescents (Viljoen,

Brodersen, Shaffer & McMahon, 2016). Three main principles are employed within Andrews and Bonta's (2010) RNR model: the *risk principle*, the *needs* and the *responsivity principle*. The *risk principle* argues that interventions need to match the individual's level of risk, with more comprehensive programs reserved for those posing a higher risk for recidivism, with very little to no intervention provided to low risk individuals (Andrew & Bonta, 2010). This ensures limited resources are targeted at those posing the greatest risk; research has additionally revealed that targeting individuals at low risk for recidivism with intensive treatment, may counter-intuitively increase their recidivism risk (Lowenkamp, Latessa, & Holsinger, 2006). The *needs principle* argues that intervention targets must correspond to criminogenic, dynamic risk factors that when addressed decrease the risk of further offending, for instance, associating with antisocial peers or substance abuse. The *responsivity principle* argues that interventions should be tailored to an individual's unique characteristics (Andrews & Bonta, 2010). Responsivity has two separate elements, the first being *specific responsivity*, stating that intervention planning should factor in aspects such as an individual's strengths and weaknesses, abilities, motivation to change, and learning style. Factors not directly connected to offending (i.e. non-criminogenic needs) may also be addressed under the *specific responsivity principle*, if it is considered that such factors may interfere with the success of any treatment, for example, the experience of emotional distress that if ignored could potentially lower the success of the treatment (Hoge, 2016). The second element is *general responsivity* which covers aspects such as the type of intervention provided, the timeframe to complete it, and intervention delivery factors such as the personal characteristics and professional background of the therapist (e.g. psychologist, counsellor, social worker), as these factors may influence treatment outcome if not considered carefully (Hoge, 2016). A meta-analysis was conducted by Koehler, Losel, Akoensi and Humphreys (2013) investigating the effectiveness of European rehabilitation programmes in the treatment of young offenders. Findings showed that programmes following the three RNR principles had the largest mean effect (OR=1.90) in terms of the reduction of recidivism with a

significant difference (16%) in recidivism rates found between treatment and non-treatment groups. Additionally, this study demonstrated that programmes showed the most success when they treated high-risk offenders (OR=1.63, p <.05), treated multiple criminogenic needs (OR=1.59, p <.05) and adhered to the specific responsivity principle (OR=1.64, p<.05).

In summary, the RNR model is a well-accepted framework that provides guidance in the assessment and treatment of adolescents who offend, assisting in the reduction of recidivism and providing a more pro-social way forward. The next section provides examples of the different treatments available when it comes to addressing youth offending.

1.5 Approaches Used to Address Youth Crime

There are two main approaches used when addressing youth delinquency, the justice and the welfare approach (Johnstone, 2016). The justice approach is informed by deterrence theory, which proposes a punishment should far outweigh any gain from crime in order to deter people from criminal behaviour (Piquero, Paternoster, Pogarsky & Loughan, 2011), This approach is also intended to hold the young person accountable for their actions, which are viewed as having arisen from personal choice and therefore requiring punishment (Johnstone, 2016). The welfare approach, in contrast, views a young person's antisocial behaviour as a symptom of a range of factors, including those outside of their influence, for instance family or community factors, and attempts to address any social or environmental factors underlying the antisocial behaviour (Johnstone, 2016). The following sections provide brief overviews of three contrasting examples: the family group conference; Multisystemic therapy (an example of a treatment-based welfare approach); and Scared Straight (justice approach).

1.5.1 The Family Group Conference

The introduction of the *Children, Young Persons and Their Families Act 1989 (CYPFA)* saw New Zealand adopt the Family Group Conference (FGC), which is based on the principle of restorative justice which allows the victim and perpetrator to meet to resolve any issues arising from the crime (Maxwell & Morris, 2006). The intent behind establishing the FGC in relation to youth justice was to improve support for children and families, particularly from the Māori perspective of family, address the the requirements of the victim, and provide alternatives to juvenile justice institutions and court processes (Maxwell & Morris, 2006). When there are care and protection issues relating to a child (such as those discussed previously under family risk factors), a FGC also enables a wider discussion between parents, the extended family and any organisations involved, and for decisions relating to ongoing care and protection to be made (Connolly & Masson, 2014).

1.5.2 Multisystemic Therapy

Multisystemic Therapy (MST) is an extensively researched treatment which was designed to address persistent and serious antisocial behaviour in children and adolescents. This therapy was developed based on the principles of Bronfenbenner's (1979) social-ecological theory regarding human development and focusses on the child or adolescent within their surrounding systems of family, peer, school and community, all of which may have an influence on their behaviour (Henggeler & Sheidow, 2012). Any risk factors within the systems are identified during an assessment and a treatment plan is made that employs a strengths-based approach. Areas within the system that are working well are identified (e.g. a strong relationship with school or extended family, academic ability) and these areas are leveraged in treatment, for instance, enlisting help from family to provide supervision for a child after school until the parents return from work (Henggeler, 2012). The treatment is individualised to the needs of the young person and their family and is intensively provided over a three to five-month time frame,

with a MST therapist available to the family 24 hours a day, seven days per week if required (Viljoen et al., 2016). A meta-analysis by Curtis, Ronan and Borduin (2004) examining MST treatment outcomes, found the average effect of MST was *d*=.55 with young people and their families operating more successfully after MST treatment when compared to 70% of young people and their families provided with an alternative treatment. MST was successful in addressing emotional and behavioural issues for individuals within participating families, improving overall relationships, reducing antisocial behaviour in the young person and association with antisocial peers. These improvements were still observed four years after treatment. A cost-benefit analysis of the sustained benefits of MST demonstrated that for every dollar spent on implementing MST, the return was a $5.04 saving to taxpayers and crime victims during the 25 years post treatment (Dopp, Borduin, Wagner & Sawyer, 2014).

1.5.3 Organised Prison Visits for Adolescents – "Scared Straight"

The American "Scared Straight" programme was designed to reduce juvenile delinquency using a justice approach. Groups of adolescents who have engaged in antisocial behaviour are taken on a visit to an adult prison, where inmates share stories relating to their experience of being in prison. The purpose of these visits is to expose the adolescents to the harsh realities of being incarcerated, with the desired outcome being to scare the adolescents enough to deter further antisocial behaviour (Petrosino, Turpin-Petrosino and Buehler, 2003). Countries other than the USA also have versions of these prison visits, used to deter young people from crime; Australia for instance, has a day in prison programme, the UK has "day visits" and Norway has the Ullersmo Project which is based on the scared straight programme (Hollis-Peel & Lavenburg, 2013; Petrosino, Turpin-Petrosino,). Evaluations of "Scared Straight" programmes have consistently demonstrated that these types of programmes do not deter further antisocial behaviour and have been shown to increase risk of antisocial behaviour (Klenowski,

Bell & Dodson, 2010; Petrosino et al., 2003). Klenowski et al., (2010) suggested that one visit is unlikely to facilitate change, as is the lack of a rehabilitative plan.

A Cochrane Collaboration Review undertaken by Petrosino, et al., (2013), examined the effectiveness of organised prison visits for adolescents. They conducted a meta-analysis of randomised trials, investigating prison visit programmes covering a 25-year period, and they concluded that participating in the scared straight programmes was not effective at reducing antisocial behaviour. The authors proposed that the increase in antisocial behaviour may occur due to a "peer contagion" effect created by grouping antisocial adolescents together to participate in these programmes.

The next section will introduce research that has previously used the dataset that will be utilised by this current study.

1.6 Previous Research Using the Child Youth and Family Dataset

Recognising the time required by professionals to undertake risk evaluations using structured assessment tools, McKinlay, James and Grace (2013) utilised existing welfare and police data from New Zealand, to develop an actuarial risk measure that could predict recidivism, and secondly to analyse whether the risks were different for males and females. Risk evaluations are a part of ensuring adherence to the RNR framework (Hoge, 2016). The idea was that the ability to automatically assess recidivism risk could provide an initial screening tool in order to prioritise higher risk individuals to undergo the lengthier structured assessments, before those scoring as lower risk on the screening tool. The sample
(n = 4307) were identified from a Child, Youth, and Family (CYF) database and consisted of all young people within New Zealand who had received a youth justice intake during 2002. A further subset of participants was identified from the total sample as those aged between 13 and 17 years during 2002 and were stratified by location to be used for the final analysis (n = 936). They obtained police contact, care and protection and youth justice information for all members

of the final sample. McKinlay et al. (2013) completed an initial analysis, using the police and CYF data, to investigate whether there were any connections between the potential predictor variables and recidivism using Pearson's correlations. Several care and protection and youth justice variables were significantly correlated. Best-subsets logistic regression and a formal model selection criterion were used to analyse the variables obtained from the CYF and Police databases further for the males only. Five factors were found to demonstrate a higher risk for future offending: age at first CYF intake (younger predicts a higher risk), prior intelligence notes and occurrences (i.e. information gathered by police regarding factors such as, gang affiliation or suspected criminal behaviour), any prior court dates and gender (males have a higher risk). An overall risk score (ORS) was assigned to the participants and the researchers identified four risk groups: low, low-medium, medium-high and high risk. The model was found to have a moderately high accuracy in predicting recidivism after one year (AUC=.71) and suggested that a less complicated model could be used to identify young people at elevated risk of recidivism and whose structured assessment could be prioritised. Further analysis revealed the model to be accurate for both males and females despite males being at higher risk of recidivism generally.

Subsequent research using the same dataset as McKinlay et al. (2013) was carried out by Kioa (2015). The first aim of Kioa's study was to examine how many of the young people receiving a youth justice intake during 2002 reoffended within the following five years, separately for the full sample and for McKinlay et al.'s subset. The second aim was to examine if the risk factors identified by McKinlay et al. (2013) as predictors of recidivism over a short period of time were also recidivism risks over a longer period. The third aim examined how accurate at predicting recidivism the actuarial tool developed by McKinlay et al. (2013) was for predicting participants who would receive convictions five years later, and to develop a statistical model predictive of long-term recidivism. Kioa's (2015) findings can be summarised as follows: 54% of participants from the entire youth justice sample received a conviction within

the following five years; the actuarial tool developed by McKinlay et al. (2013) predicted longer term recidivism risk for males only and the model developed to predict long term recidivism demonstrated moderate accuracy.

1.7 Purpose of This Research

Using the same dataset recorded by Child, Youth and Family, and utilised in the previous research by McKinlay et al. (2013) and Kioa (2015), the first aim of the current study was to investigate the possible existence of subgroups within the data, based on known risk factors for recidivism, using cluster analysis. Cluster analysis has been referred to as a person-centred method, in contrast to other more variable-centred methods such as factor analysis and is useful for considering outcomes for a heterogeneous population (Henry, Tolan & Gorman-Smith, 2005), for instance young people who have behaved antisocially. Given prior research findings that factors such as: early onset of antisocial behaviour (Fergusson et al., 2005; Moffitt, 2003), a history of childhood maltreatment (Malvaso et al., 2016), though not all maltreated children become antisocial (Widom & Maxfield, 1996) and having multiple changes in out of home care (Ryan et al., 2010) influence the risk for later offending, a second aim of the current study was to examine any association between cluster group membership and later offending (between the years 2003 and 2018), using extended follow-up conviction data obtained from the Ministry of Justice. The third aim was to ascertain if subgroups identified in this study would bear similarities to the risk groups identified by McKinlay et al. (2013).

Identifying subgroups using both prior risk and later recidivism information would allow interventions to be adapted to prioritise those posing the greatest risk, and to better meet the specific needs of all young people referred to the youth justice system.

Chapter Two - Method

2.1 Research Consents

An application was made to the University of Canterbury's Human Ethics Committee, who provided consent to proceed. A copy of this approval is presented in Appendix A. The Ministry of Social Development's Research Access Committee provided consent to use the Child Youth and Family data and this is presented in Appendix B. Māori consultation was initiated and a letter of support, provided by Ngā Tahu Consultation and Engagement Group, is presented in Appendix C. The Ministry of Justice supplied tables showing number of people, charges, convictions and offence types for each cluster. Individual offence histories were not supplied therefore further consent processes were not required.

2.2 Dataset Participants

This study was based on the same cohort of young offenders used by McKinlay et al. (2013). The criterion for inclusion in this dataset was having a Youth Justice intake, due to committing an offence as a child or young person within New Zealand, during the year 2002. Data regarding the participants (n = 4,307) was obtained from the Child, Youth and Family (renamed Oranga Tamariki in 2017) database.

2.3 Child Youth and Family Variables

The government department responsible for overseeing the wellbeing of children and youth in New Zealand is Oranga Tamariki/Child Youth and Family, providing two branches of referral. The first is Care and Protection and the second is Youth Justice. Information relating to the sample used in this thesis was obtained from Child, Youth and Family by McKinlay et al. (2013), who imported a range of variables into a Microsoft Access database, as feasible risk factors for predicting recidivism. Table 1 provides a list of the variables with the use of the word *prior* referring to before the criterion date of 2002.

Care and protection referrals are made when a child or youth is believed to be at risk of harm due to abuse or neglect. A social worker is assigned to the child/youth to assess the level of risk, removing them from the home if required. Records are kept regarding their findings connected to any reported abuse (physical, sexual, emotional, neglect), any behavioural or relationship difficulties, and whether self-harm has occurred. If the child is removed urgently from their home due to any risk of harm, or aged less than 10 years old, this is recorded by the social worker and complies with Section 15 of the Child Young Persons and Their Families Act (1989).

Youth Justice referrals are made by police if a child/youth over ten years of age has committed an offence. A Family Group Conference (FGC) is arranged if the offending is of a serious nature and is attended by family, potentially any victims of the offence, and police. The underlying principle of the FGC is restorative justice, where the young person is held accountable for their offending. Any underlying problems the child/youth has (e.g. addiction, mental health) are discussed and a plan is put in place to address these problems. The aim of the FGC is to intervene early to redirect the young person towards a more prosocial pathway, avoiding the adult justice system as they enter late adolescence (Morris & Maxwell, 2001).

In New Zealand when a young person has committed a serious crime, other than murder or manslaughter, they will be referred to the Youth Court. Most young people appearing in the Youth Court are aged between 14 and 16 years, however, children aged 12 and 13 years old who have been charged with a serious crime will also appear in the Youth Court. Cases involving young people committing very serious crimes (i.e. murder or manslaughter), may be transferred to the District Court (Ministry of Justice).

Table 1

Full List of Child, Youth and Family variables contained in the McKinlay et al. dataset

Variables
Care and Protection
Sex of the Child
Age at First Child, Youth and Family Intake
Number of Prior Care and Protection Orders
Number of Prior Intakes
Number of Prior Placements
Prior Intake Under Section 15
Urgent Prior Intakes
Prior Intakes Before the Age of 10
Number of Prior Social Worker Findings
- Emotional Abuse
- Behavioural and/or Relationship Difficulties
- Neglect
- Physical Abuse
- Self Harm and/or Suicidality
- Sexual Abuse
Youth Justice
Age at First Youth Justice Intake
Number of Prior Youth Justice Intakes
Prior FGC – No Agreement
Prior Supervision Orders
Prior FGC Resulting in Custody or Supervision
Total Number of Prior Court Orders
Prior Court Dates
Court Custody Orders
Court Ordered Custody/Supervision
Prior Youth Justice Outcomes
Number of Prior Youth Justice FGC

2.4 Data Analysis

Exploratory cluster analyses were undertaken in which two through five subgroups of cases were identified using the Child, Youth and Family variables. K-means clustering was used to obtain the subgroups. For each cluster solution centroids were viewed and graphed to visually study the data. To examine relationships within the data cross tabulations were completed, comparing two clusters with three clusters, three clusters with four clusters and four clusters with five clusters. After this process 11 variables were chosen as the best fit: Age at first CYF intake, age at first youth justice intake, number of prior care and protection, number of prior youth justice, number of prior intakes, number of urgent intakes, number of prior placements, number of social worker findings, number of youth justice FGC, number of prior court dates and number of custody or supervisory outcomes. Cross tabulations were conducted to ascertain the numbers for the individual social worker findings across the clusters.

The 11 variables were then standardised, due to being measured on different scales and ranges. When there are variables that have a larger range than other variables used, for instance the age measures when compared to the number of occurrence measures, these may have a larger impact in determining clusters (Henry, Tolan & Gorman-Smith, 2005). The outliers were trimmed (standard deviations >5 or <-5).

K-means cluster analysis was completed using the standardised variables. The means were calculated for each cluster on the different variables creating a profile for each cluster, enabling the cluster that makes the most sense in terms of interpretability to be selected. Cross tabulations were completed comparing 2 clusters with 3 clusters, 3 clusters with 4 clusters and 4 clusters with 5 clusters to visually examine the redistribution of cases across clusters. A one-way analysis of variance (ANOVA) was used to determine whether there were any statistically significant differences between the means of the clusters and a Tukey HSD post hoc test to show where the differences between groups occurred. Chi square analyses were conducted for tests of

significance. All data analyses were completed using SPSS version 25.0.0 (IBM, 2017). The significance cut-off was set at .05 for statistical testing.

2.5 Reoffending Variables

Aggregated reoffending data was provided by the Ministry of Justice for the purpose of the current study. They provided conviction data pertaining to each cluster and the number of convicted charges, by offence type per cluster. The offence type is based on the Australian and New Zealand Standard Offence Classification (ANZSOC) division. The data provided was for each year between 2003 to June 2018.

Chapter Three – Results

3.1 Descriptive Statistics for the Total Sample

Of the total sample (*N* = 4307), 79.9% (*n* = 3440) were male and 20.1% (*n* = 867) were female. The mean age of the participants during the criterion year of 2002 for inclusion in the sample was 15.76 years (*SD* = 1.14), with ages ranging between 7.35 and 22.80 years. The dataset specified ethnicity dichotomously as either European/Other or Māori/Pacific. There were 52.4% (*n* = 2258) European/Other and 47.6% (*n* = 2049) Māori/Pacific.

The means and standard deviations for all possible risk factors included in the Child, Youth and Family dataset were calculated and are presented in Table 2, providing a simple description of the distribution of the risk variables.

Cross tabulation analysis between each of the individual social worker findings and cluster membership found the total number of substantiated findings were as follows. Findings for emotional abuse were, cluster one (14 %), cluster two (1%), cluster three (0.39%) and cluster four (12%). Findings for neglect were, cluster one (37%), cluster two (6%), cluster three (2%) and cluster four (34%). Findings for physical abuse were, cluster one (36%), cluster two (3%), cluster three (3%) and cluster four (36%). Findings for sexual abuse were, cluster one (25%), cluster two (2%), cluster three (2%), and cluster four (25%). Findings for self-harm were, cluster one (2%), cluster two (1%), cluster three (0.16%) and cluster four (4%). Findings for behaviour/relationship difficulties were, cluster one (62%), cluster two (30%), cluster three (8%), and cluster four (78%).

Table 2
Means and Standard Deviations of the Possible Risk Factors for the Total Cohort

Variable	*M*	*SD*
Care and Protection Variables		
Age at first Child, Youth and Family Intake	12.60	4.07
Number of Prior Care and Protection Orders	1.31	1.53
Number of Prior Intakes	2.21	2.44
Number of Prior Placements	0.71	1.33
Prior Intake Under Section 15	0.70	1.16
Urgent Prior Intakes	0.71	1.20
Prior Intakes Prior to Age 10	1.91	2.62
Number of Prior Social Worker Findings	1.00	1.39
- Emotional Abuse	0.05	0.24
- Behavioural and/or Relationship Difficulties	0.42	0.80
- Neglect	0.18	0.56
- Physical Abuse	0.16	0.49
-Self Harm and/or Suicidality	0.01	0.11
- Sexual Abuse	0.10	0.37
Youth Justice Variables		
Age at First Youth Justice Intake	15.34	1.19
Number of Prior Youth Justice Intakes	0.63	1.17
Number of Prior FGC – No Agreement	0.04	0.24
Number of Prior Supervision Orders	0.07	0.38
Number of Prior FGC Resulting in Custody or Supervision	0.72	1.53
Total Number of Prior Court Orders	0.40	1.16
Number of Prior Court Dates	0.34	0.96
Number of Court Custody Orders	0.13	0.48
Number of Court Ordered Custody/Supervision	0.20	0.70
Number of Prior Youth Justice Outcomes	0.09	0.47
Number of Prior Youth Justice FGC's	0.52	1.08

3.2 Exploratory Cluster Analysis

Figure 1 shows the results from the cross-tabulation that examined the relationships within the data between two, three, four and five cluster solutions. A four-cluster solution was chosen as the best fit for the data and supported by previous research. A five-cluster solution was rejected as it separated the cases found in the four-cluster solution by gender.

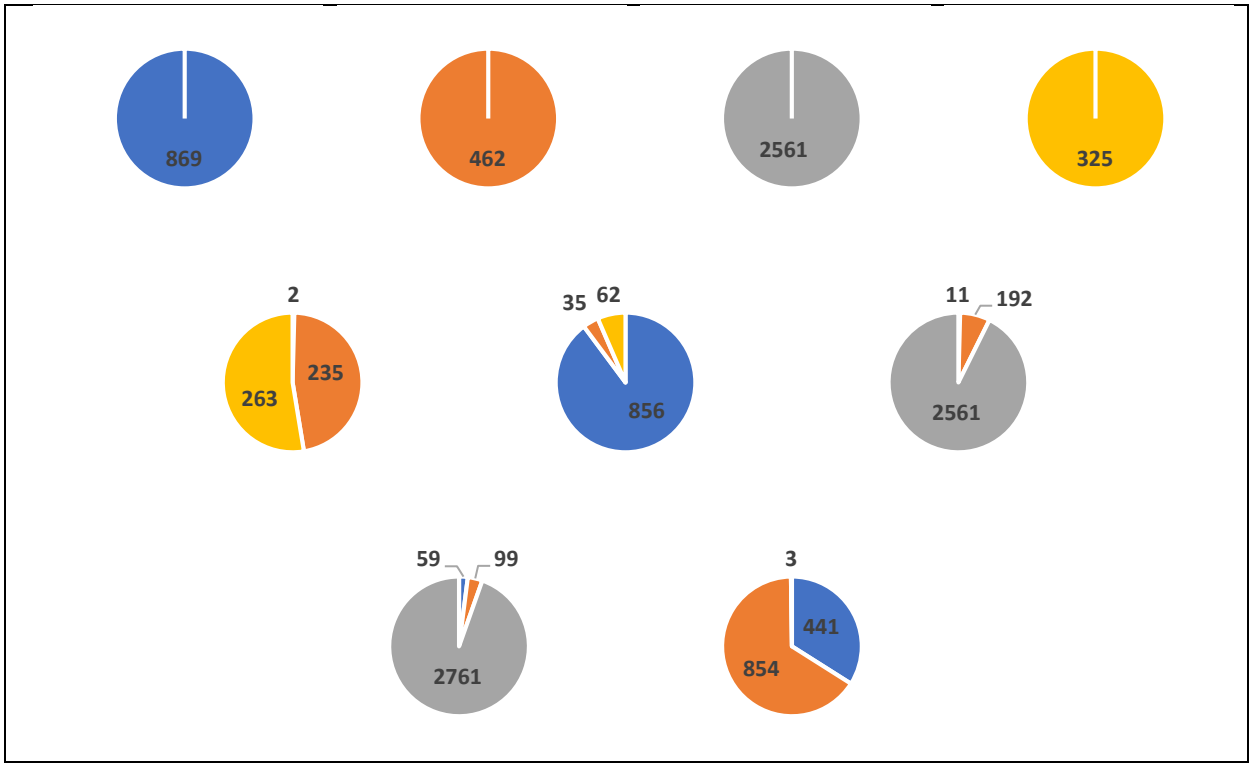

Figure 1. Cases assigned to a two cluster through to a four-cluster solution using the Child, Youth and Family variables.

3.3 The Final Child Youth and Family Clusters

The final K-means cluster analysis using the standardised variables with outliers trimmed provided a total sample of (*N*=4217). Table 3 contains the results from the One-way ANOVA, including the standardised means for each CYF variable within each cluster, and the Tukey HSD post hoc comparison.

The participants in cluster one had the youngest age at first Child, Youth and Family (CYF) intake, the highest number of prior care and protection orders, the largest number of prior CYF intakes classed as urgent and the highest number of social worker findings, however, no

significant difference was found between cluster one and cluster four in relation to the number of social worker findings. Cluster one had the second highest total number of previous intakes. Participants in this cluster were less likely than clusters two and four to have any Child, Youth and Family intakes connected with youth justice, for instance the number of prior youth justice intakes, the number of youth justice FGC's, the number of prior court dates and the number of court ordered custody/supervision. However, cluster one were more likely to have a youth justice intake than cluster three.

The participants in cluster two were less likely to have received a CYF intake connected with care and protection, for instance, the number of prior care and protection intakes, the number of urgent intakes, the number of prior placements and the number of social worker findings, than clusters one and four though they were more likely to when compared to cluster three. Participants in cluster two were more likely to have received an intake connected with youth justice, than clusters one and three. This cluster was second highest after cluster four for the youth justice variables: number of prior youth justice intakes, number of prior court dates, number of court ordered custody/supervision and the number of prior youth justice FGC's, although there was no significant difference found between cluster two and four in relation to the number of prior youth justice FGC's.

Even though cluster three had the highest number of participants this cluster was the least likely to have received a CYF intake for either care and protection or youth justice for all of the CYF variables analysed. Cluster three participants had the highest age for both age at first intake and age at first youth justice.

Participants in cluster four were found to have the youngest age at first youth justice intake and had the highest number of: prior youth justice intakes, total number of CYF intakes, prior placements, prior court dates, court ordered custody/supervision and prior youth justice FGC's, though this last variable was not found to be significantly different from cluster two.

Cluster four participants had the second youngest age for the variable age of first CYF intake after cluster one and came second to cluster one for the CYF variables: number of prior care and protection orders, prior intakes classed as urgent and the number of social worker findings. The number of social worker findings was not found to be significantly different between cluster one and cluster four.

Table 3

Standardised Means, ANOVA and Tukey HSD for the Child, Youth and Family Variables Within Each Cluster

	Cluster Membership				
	1	2	3	4	
Variables	*n=869*	*n*=462	*n*=2561	*n*=325	*F*(3, 4213)
Age at First Child, Youth and Family Intake	-1.14_a	0.06_b	0.51_c	-0.89_d	1379.***
Age at First Youth Justice Intake	-0.23_a	-0.52_b	0.31_c	-0.87_d	318.***
Number of Prior Care and Protection Orders	1.35_a	-0.14_b	-0.62_c	1.24_d	4128.***
Number of Prior Youth Justice Intakes	-0.29_a	1.45_b	-0.44_c	1.68_d	2561.***
Number of Prior Intakes Under Section 15	0.94_a	0.63_b	-0.69_c	1.61_d	4269.***
Prior Intakes Classified as Urgent	1.13_a	-0.29_b	-0.49_c	0.88_d	1652.***
Number of Prior Placements	0.47_a	0.01_b	-0.47_c	1.91_d	1361.***
Number of Prior Social Worker Findings	1.26_a	-0.25_b	-0.57_c	1.24_a	2836.***
Number of Prior Youth Justice FGCs	-0.28_a	1.27_b	-0.39_c	1.29_b	1728.***
Number of Prior Court Dates	-0.18_a	0.27_b	-0.31_c	1.61_d	1267.***
Number of Court Ordered Custody/ Supervision	-0.17_a	-0.001_b	-0.27_c	1.57_d	1362.***

Note: means with a different subscript indicate significant differences at $p<.05$ for each variable between clusters.

***$p<.001$

3.4 Cluster Demographics

Cluster one contained the second highest number of participants with 20.6% (n=869) of the sample. The gender composition was 71.7% (*n*=623) male and 28.3% (*n*=246) female, with this cluster having the largest proportion of females when compared to the other three clusters. Ethnicity of this cluster was 45% (*n*=391) European/Other and 55% (*n*=478) Māori/Pacific.

Cluster two had the second lowest number of participants with 11% (*n*=462) of the total sample. The gender composition was 86.2% (*n*=398) male and 13.9% (*n*=64) female, with this percentage of females being the lowest proportion of females across the clusters. Ethnicity was 45% (*n*=205) European/Other and 55% (*n*=257) Māori/Pacific.

Cluster three had the highest number of participants with 60.7% (*n*=2561) of the total sample. The gender composition was 80.9% (*n*=2073) male and 19.1% (*n*=488) female. Even though the proportion of females was lower than cluster one, cluster three had the highest total number of females when compared to the other three clusters. Ethnicity was 57.8% (*n*=1480) European/Other and 42.2% (*n*=1081) Māori/Pacific.

Cluster four has the lowest number of participants with 7.7% (*n*=325) of the total sample. The gender composition was 83.4% (*n*=271) male and 16.6% (*n*=54) female. Ethnicity was 43.1% (*n*=140) European/Other and 56.9% (*n*=185) Māori/Pacific.

To ascertain whether a difference was present across the four clusters between males and females a chi square was calculated with a statistically significant result χ^2 (3, *N*=4214) = 51.66, *p*= <.05. A statistically significant chi square result was also found between European/Other and Māori/Pacific across the four clusters χ^2 (3, *N*=4214) = 72.18, *p*= <.05.

To briefly summarise the characteristics of the four clusters, which are displayed in figure 2, cluster one was the group most likely to have a care and protection intake and at a

young age, had the highest proportion of females across the clusters and little prior offending. Cluster two were prior offenders but not as high risk as cluster four and compared to cluster four had little care and protection history. Cluster three had little care and protection and prior youth justice histories and were the largest group, resembling Moffitt's (1993) adolescent-limited offending group. Cluster four was the highest risk, early onset and repeat offenders, with a high number of placements.

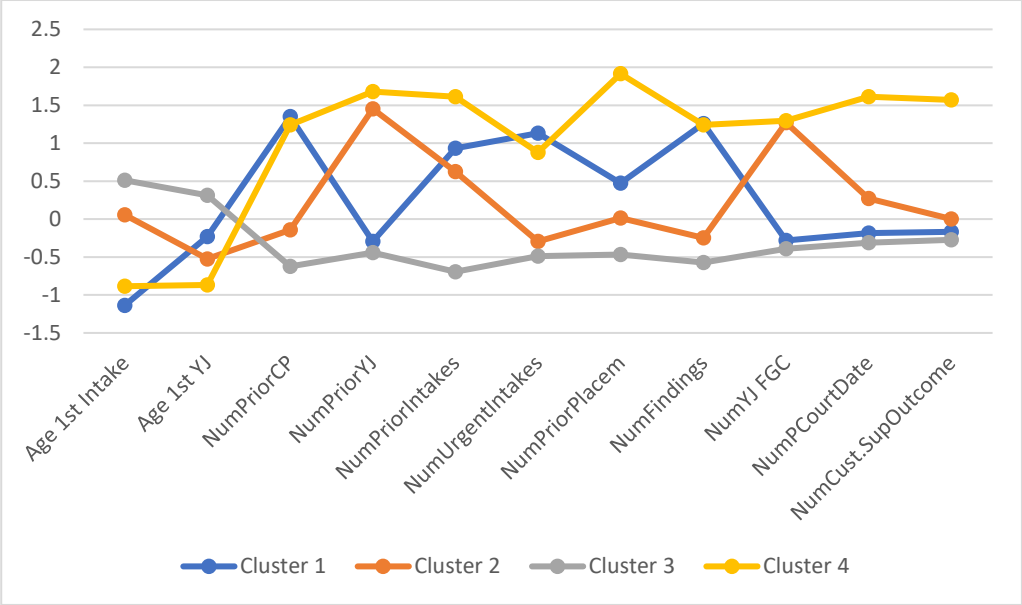

Figure 2. Standardised means for each Child, Youth and Family variable within the clusters.

3.5 Proportion of Cluster Showing Convicted Charges Per Person (2003 – June 2018)

Table 4 contains the proportion per cluster in percentages for the total numbers of convicted charges per person, across the entire follow-up period (2003 to June 2018). The proportion of cases with at least one conviction per cluster were: cluster one (76%), cluster two (81%) cluster 3 (70%) and cluster four (83%) with this found to be a significant difference across the four clusters χ^2 (3, N=4214) = 48.72, p= <.05. Cluster three showed the highest proportion of having no record of convicted charges between 2003 and June 2018 and the lowest proportion of convicted charges from 1 to 100 or more when compared to the other clusters. Cluster four shows the lowest proportion of no record of charge per person and the highest

proportion of convicted charges from 1 to 100 or more between 2003 and June 2018. Cluster two has the highest proportion of 10 to 24 convicted charges followed by clusters three and one, however for 25 through to 100 or more convicted charges per person, there is little difference between clusters one and cluster two. Figure 3 displays the changes proportionally for the clusters as they move from no record of charge through to 100 or more convicted charges and displays the proportion of repeat offending across the clusters.

Table 4

The Proportion of each Cluster by the total Number of Convicted Charges Per Person across the follow-up period (2003 – June 2018)

Convicted charges	Cluster membership			
	1 (*n*=869)	2 (*n*=462)	3 (*n*=2558)	4 (*n*=325)
No record of charge	212 (24%)	87 (19%)	769 (30%)	54 (17%)
Less than 10	175 (20%)	83 (18%)	782 (31%)	34 (10%)
10 to 24	160 (18%)	113 (24%)	495 (19%)	42 (13%)
25 to 49	186 (21%)	106 (23%)	318 (12%)	86 (26%)
50 to 74	77 (9%)	50 (11%)	144 (6%)	67 (21%)
75 to 99	43 (5%)	17 (4%)	35 (1%)	25 (8%)
100 or more	16 (2%)	6 (1%)	15 (1%)	17 (5%)

Note: Six unique CYF_IDs were merged into 3 unique CYF_IDs by the Ministry of Justice due to there being two separate files for three clients. These six clients were from Cluster three, resulting in a lower total than previously indicated.

3.6 Proportion of Cluster Convicted at Least Once Each Year (2003 – 2017) As shown in Figure 4 all four clusters demonstrated an increase in the proportion of the cluster receiving a conviction at least once within each year between 2003 and 2007, with Table

5 containing the percentage of each cluster convicted at least once each year. Cluster one showed an increase in convictions between 2003 and 2007, which then began decreasing yearly between

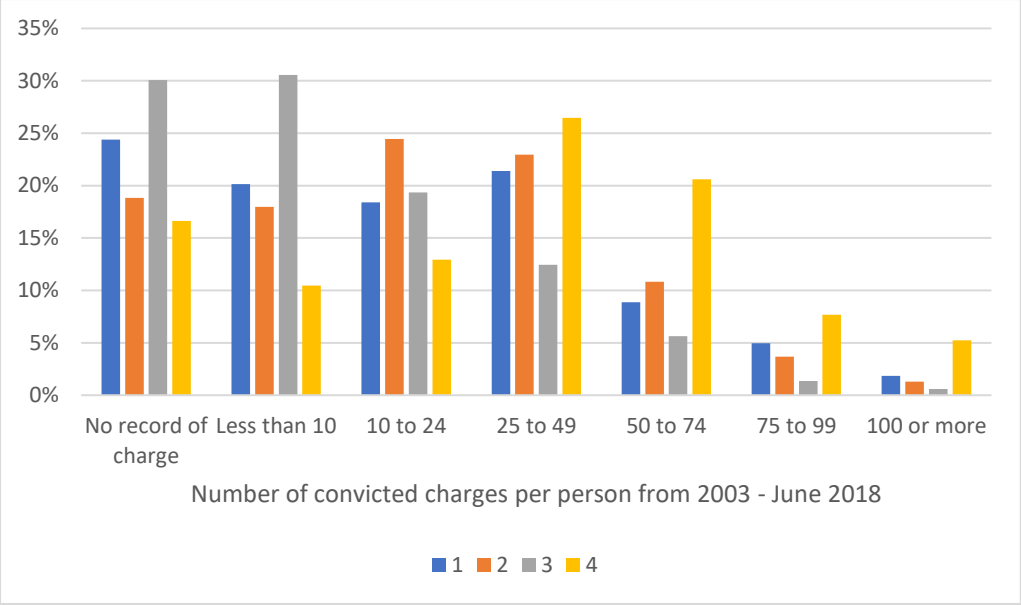

Figure 3. Proportion of each cluster by the number of convicted charges per person. This chart displays the changes in the clusters moving from no record of convicted charges to 100 or more.

2008 and 2017. Cluster two showed yearly increases for 2003 and 2004, then plateaued during 2005 and 2006, then decreasing yearly from 2007, except for an increase during 2016. Cluster three showed an increase in the proportion of yearly convictions between 2003 and 2005, plateaued between 2005 to 2007, then decreasing yearly from 2008. Cluster four showed yearly increases between 2003 and 2005, plateaued between 2006 and 2009, and decreasing yearly from 2010. The cluster with the highest proportion of convictions per year, every year between 2003 and 2018, was cluster four. Cluster two started in 2003 with the second highest proportion per cluster for convictions, noticeably higher than cluster one which had the third highest, however, by 2007 clusters one and two had similar proportions of convictions per cluster per year except for the occasional spike in convictions for cluster two during the years 2010, 2011 and 2016. Cluster three had the lowest proportion of convictions per year across all years between 2003 and 2018.

3.7 Number of Convicted Charges by Offence Type and Cluster Membership

Table 6 shows the number of convicted charges by offence type and cluster membership. Cluster

one has 21% of the total number of participants yet are over-represented for all offence types except for drugs, fraud and deception, dangerous acts and miscellaneous, having committed between 24% and 38% of the remaining types of offences. The overall proportion of the total amount of offences committed by this sample between 2003 and June 2018 perpetrated by cluster one is 25% of the total. Cluster one most notably committed 30% of abduction and harassment offences, 30% of sexual offences and 38% of homicides. Cluster two has 11% of the total number of participants and committed 13% of the overall total offences committed. The highest proportion of crimes committed by cluster two for any offence type were 16% for both drugs and fraud/deception, and 17% for homicide. Overall cluster two did not commit a large proportion of the total offending across offence types

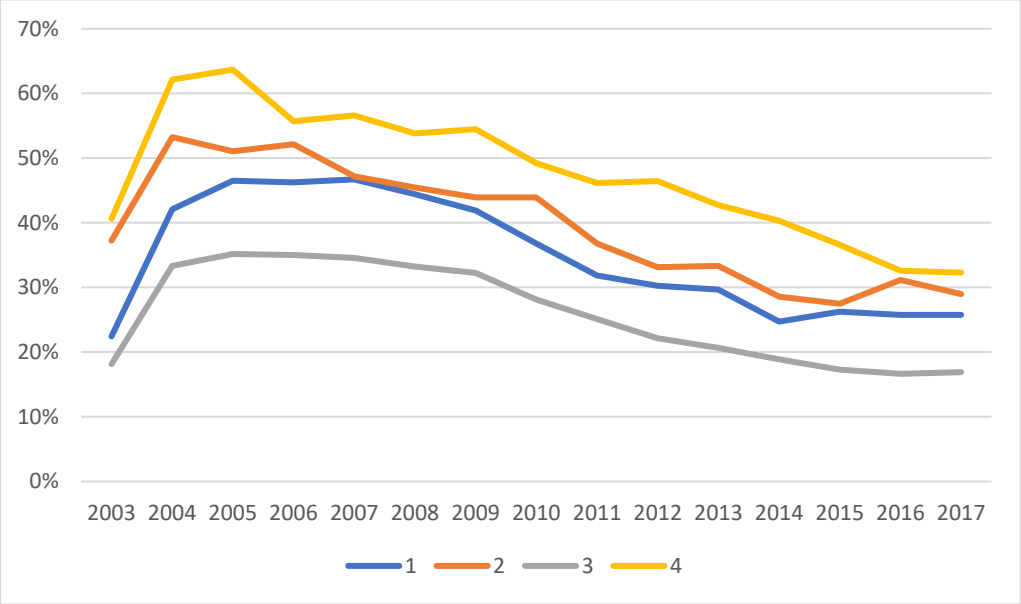

Figure 4. The proportion of each cluster convicted at least once during each year between 2003 - 2017, demonstrating conviction trends across the clusters over time.

during the follow-up period. Cluster three has the largest proportion of participants within the total sample with 61%, however, for all offence types cluster three received proportionally less than 61% of the convictions, ranging between 37% for burglary and unlawful entry to 58% for miscellaneous. Cluster three were responsible for 38% of murders, however. The total proportion of crimes committed in total by cluster three was 43%. Cluster four has 8% of the

total participants but for all offence types except homicide, committed proportionally a high number of the offences. Notably cluster four committed 21% of the burglary and unlawful entry offences, 23% of the fraud and deception offences and 20% of robbery and extortion offences. Cluster four committed 15% of the total overall offences between 2003 and June 2018 perpetrated by this sample.

Table 5

The Proportion of Each Cluster Convicted Once or More During Each Full Year between the years 2003 and 2017

	Cluster Membership			
Year	1 (*n*=869)	2 (*n*=462)	3 (*n*=2561)	4 (*n*=325)
2003	22%	37%	18%	41%
2004	42%	53%	33%	62%
2005	46%	51%	35%	64%
2006	46%	52%	35%	56%
2007	47%	47%	35%	57%
2008	44%	45%	33%	54%
2009	42%	44%	32%	54%
2010	37%	44%	28%	49%
2011	32%	37%	25%	46%
2012	30%	33%	22%	46%
2013	30%	33%	21%	43%
2014	25%	29%	19%	40%
2015	26%	27%	17%	37%
2016	26%	31%	17%	33%
2017	26%	29%	17%	32%

Table 6

Number of Convicted Charges by Offence Type and Cluster of the Person Convicted (2003 – June 2018

	Cluster Membership				
	1	2	3	4	
Offence Type	*n* =869 (21%)	*n* = 462 (11%)	*n*= 2561 (61%)	*n* =325 (8%)	Total
Against justice	4697 (26%)	2482 (14%)	8248 (45%)	2828 (15%)	18255
Traffic	3031 (24%)	1847 (14%)	6496 (50%)	1519 (12%)	12893
Theft	3604 (28%)	1880 (15%)	4921 (39%)	2258 (19%)	12663
Public order	1704 (26%)	863 (13%)	2937 (46%)	932 (14%)	6436
Injury causing	1587 (27%)	797 (13%)	2714 (45%)	876 (15%)	5974
Burglary, unlawful entry	1455 (29%)	654 (13%)	1890 (37%)	1057 (21%)	5056
Property damage	1287 (29%)	600 (14%)	1844 (42%)	665 (15%)	4396
Drugs	841 (21%)	638 (16%)	1922 (47%)	655 (16%)	4056
Dangerous acts	642 (22%)	432 (15%)	1511 (52%)	344 (12%)	2929
Fraud, deception	495 (19%)	423 (16%)	1106 (42%)	597 (23%)	2621
Weapons	449 (29%)	198 (13%)	626 (41%)	263 (17%)	1536
Abduction, harassment	327 (30%)	138 (13%)	437 (41%)	173 (16%)	1075
Robbery, extortion	189 (27%)	83 (12%)	288 (41%)	140 (20%)	700
Miscellaneous	42 (19%)	28 (13%)	126 (58%)	22 (10%)	218
Sexual	60 (30%)	23 (12%)	92 (46%)	25 (13%)	200
Homicide	16 (38%)	7 (17%)	16 (38%)	3 (7%)	42
Totals	20426 (25%)	11093 (13%)	35174 (43%)	12357 (15%)	82495

Chapter Four – Discussion

The first aim of the present study was to examine the same care and protection and youth justice data used in previous research by McKinlay et al. (2013) and Kioa (2015), using exploratory cluster analysis to identify unobserved subgroups within this population. The secondary aim was to determine the re-offending patterns of the identified subgroups over time, by using conviction data provided by the Ministry of Justice for the years 2003 to 2018. Finally, the third aim was to ascertain if subgroups identified in this study would bear similarities to the risk groups identified by McKinlay et al. (2013).

4.1 Cluster Profiles

The individual clusters will be described next, discussing how the Child Youth and Family and the re-offending variables are distributed across the clusters with a brief discussion in relation to their fit with the previous research.

4.1.1 Cluster One

The analysis of the full data set showed that participants in cluster one experienced the highest percentage of substantiated social worker findings for emotional abuse and neglect. The percentage of findings for both physical and sexual abuse were high, however these were the same as the findings for cluster four. Social worker findings related to behavioural/relationship difficulties were also high, though these findings were second highest when compared to cluster four. Findings for self-harm were second highest after cluster four at 2%. The final four cluster solution, using the standardised dataset, showed that cluster one had predominantly a care and protection profile rather than a youth justice profile. Participants in cluster one had the youngest age at first CYF intake, received the highest number of care and protection intakes, urgent CYF intakes and had the highest number of social worker findings. Cluster one was less likely than clusters two and four to have a youth justice intake. This cluster had the second highest number

of participants and the largest proportion of females when compared to the other three clusters, though the highest total number of females were found in cluster four. Proportionally there were a higher number of Māori/Pacific participants than European/Other.

In relation to the reoffending data, the proportion of the total number of convicted charges per person, between 2003 and 2018, highlighted that 24% of cluster one had no record of convicted charge over that time frame and participants in this cluster were less likely to be repeat offenders when compared to clusters two and four. The data for the proportion of the cluster convicted at least once each year, between 2003 and 2017, showed offending increased between the years 2003 to 2007, however the proportion of cluster two receiving a conviction continually decreased between the years 2008 and 2017, indicating that these individuals were committing less offences as they reached young adulthood. The types of crimes proportionally committed by each cluster showed that cluster one committed a large proportion of homicides but this was equal to the proportion committed by cluster three, which had a much higher total amount of participants. Abduction and harrassment offences, sexual offences, burglary/unlawful entry, property damage and weapons offences were proportionally high for this cluster.

The participants in cluster one had the highest number of care and protection histories with the highest social worker findings for abuse (i.e. emotional, sexual, physical) and neglect, which have been linked to later offending (Maxfield et al., 2000). While participants in cluster one were less likely to be repeat offenders, proportionally they committed high rates of homicide, abduction and harrassment offences and sexual offences, providing some support for research that shows maltreated children are more likely to commit violent crime (Langford et al., 2007) and that cumulative maltreatment increases risk (Ryan & Testa, 2005). This cluster would potentially be the equivalent to the low-medium risk group from the McKinlay et al. (2013) study.

4.1.2 Cluster Two

The analysis of the full data set showed that participants in cluster two had less social worker findings relating to CYF care and protection intakes than clusters four and one however, social worker findings for substantiated behavioural/relationship difficulties were moderately high. The final four cluster solution, using the standardised dataset, showed that cluster two had more of a youth justice profile, when compared to clusters one and three, with a high number of prior youth justice intakes and the second youngest age after cluster four, for age at first youth justice intake. There were a high number of youth justice FGC's, but no significant differences were found between clusters two and four in relation to the number of prior FGC's. Cluster two were not as high risk as cluster four with less prior placements, number of prior court dates and the number of court ordered custody/supervision orders. This cluster had the second lowest number of participants, after cluster four, and the lowest proportion of females across the clusters. Proportionally there were a higher number of Māori/Pacific participants than European/Other.

The reoffending data showed that the proportion of cluster two who had no record of convicted charge, across the follow-up period between 2003 and 2018, was 19%. Overall this cluster showed less repeat offending than cluster four, though a similar amount to cluster one, and a higher proportion than cluster three. The data for the proportion of the cluster convicted at least once each year, between 2003 and 2017, showed cluster two had a higher amount of yearly convictions when compared to clusters one and three but had a lower number than cluster four. Cluster two showed an increase in offending for 2003 and 2004 but a decrease over time in the number of convictions. The information relating to the types of crimes proportionally committed by each cluster, showed that cluster two had the second highest proportion for convictions relating to homicide, though this was lower than clusters one and three. Fraud and deception and drug offences were the next two highest convicted charges for cluster two, but these were lower

than clusters one and three. Overall cluster three did not have a high proportion of the convicted charges for all of the offence types.

This cluster most closely resembles Moffitt's (1993) low-level-chronic group as they had prior youth justice histories, little care and protection history and were not as high risk as cluster four. Without having any personal information regarding personality features, described by Moffitt as unapealing to others, it would be difficult to conclusively state that cluster three are the low-level-chronic group. This cluster would potentially be the equivalent to the medium-high risk group from the McKinlay et al. (2013) study.

4.1.3 Cluster Three

The analysis of the full data set showed that participants in cluster three had very low rates of substantiated social worker findings for all types of abuse, self-harm and behavioural/relationship difficulties. The final four cluster solution, using the standardised dataset, showed that cluster three were the least likely of all four clusters to receive either a care and protection or youth justice intake and had the highest age for both age at first care and protection intake and age at first youth justice intake. Cluster three was the lowest risk group when compared to clusters one, two and four. The highest number of participants from the total sample were found in cluster three and the second highest proportion of females were in this cluster. There were a higher percentage of European/Other participants than Māori/Pacific and this was the only cluster with a higher number of European/Other participants.

The reoffending data showed that the proportion of cluster three who had no record of convicted charge across the follow-up period, between 2003 and 2018, was 30% which was the highest percentage across all four clusters. Cluster three participants were less likely to be repeat offenders in comparison to the other clusters. The data for the proportion of the cluster convicted at least once each year, between 2003 and 2017, showed cluster three had the lowest proportion of yearly convictions. The information relating to the types of crimes proportionally committed

by each cluster showed that cluster three had the highest equal proportion of homicide, with the same number as cluster one. Traffic offences, dangerous acts (e.g. careless or reckless driving) and miscellaneous (e.g. public health and safety offences) were the three highest convicted charges for cluster three.

Cluster three most closely resembles Moffitt's (1993) adolescent-limited offender, being the larger group and without the care and protection and youth justice histories, as seen in clusters one and four. Cluster three had the highest number of participants who did not reoffend and they had the least yearly convictions over the follow-up period. The types of crimes proportionally highest for cluster three were typically crimes committed by adolescents and young adults. This cluster did commit a high proportion of homicides but this may be a reflection of the larger size of this cluster. Even though this cluster had the highest number of participants who did not reoffend, it was still responsible for a substantial amount of offending, due to the size of the cluster. This cluster would potentially be the equivalent to the low risk group from the McKinlay et al. (2013) study.

4.1.4 Cluster Four

The analysis of the full data set showed that participants in cluster four experienced the highest percentage of substantiated social worker findings for physical and sexual abuse, however these were the same as cluster one. Emotional abuse findings were the second highest for cluster four, behind cluster one. The findings related to self-harm were the highest for cluster four at 4%. Cluster four had the highest percentage of behavioural/relationship difficulties. The final four cluster solution, using the standardised dataset, showed that cluster four had the highest youth justice risk and had the youngest age at first youth justice intake and the highest number of prior youth justice intakes, placements, number of prior court dates and court ordered custody/supervision. This cluster had a high number of FGC's, though these were equally high for cluster two, with no significant difference found between clusters two and four. Cluster four

were second after cluster one in relation to the care and protection intakes, with no significant difference found between clusters one and four in relation to the social worker findings. This cluster had the least number of participants with the second lowest proportion of females. There was a higher proportion of Māori/Pacific participants than European/Other.

In relation to the reoffending data, the information showing the proportion of the total number of convicted charges per person, between 2003 and 2018, 17% of cluster four had no record of convicted charge during this time period and this was the lowest percentage across the clusters. Cluster four had the highest number of convicted charges, compared to the other clusters and were the most likely to be repeat offendeers. The data for the proportion of the cluster convicted at least once each year, between 2003 and 2017, showed cluster four had the highest proportion of convictions per year in comparison to the other clusters. While cluster four does show a decrease in convictions over time, this decrease starts later than the other clusters, indicating participants are convicted at higher rates and over a longer period of time than the other clusters. The information relating to the types of crimes proportionally committed by each cluster showed that the highest convicted charges for cluster four were for theft, burglary/unlawful entry, fraud and deception and robbery/extortion.

Cluster four resembles Moffitt's (1993) life-course-persistent offender, being a small group of predominantly males, who are repeat offenders with an early onset of offending, with a high number of placements. The social worker findings indicate that participants in cluster four come form high-risk environments that have been shown to increase the risk for antisocial behaviour (Malavaso et al., 2016). This cluster would potentially be the equivalent to the high risk group from the McKinlay et al. (2013) study.

4.2 Practical Implications

Understanding how the care and protection and youth justice histories of children and adolescents cluster together, allows the targeting of programmes to where the greatest needs are.

This study highlights that having a care and protection and youth justice history influences later antisocial behaviour and using data already available could identify areas where preventative programmes could be implemented universally to lower risk. McAra and McVie (2010) have advised that universal programmes have the ability to reach vulnerable populations, particularly as it would be difficult to predict in advance which individuals within these populations would continue to behave antisocially long-term, and to avoid stigmatysing vulnerable families and young people.

4.3 Limitations

Many children and adolescents who behave antisocially never come to the attention of youth justice or child welfare agencies, meaning this research can not be generalised to other groups of children and adolescents, who behave antisocially. The results may only apply to this sample due to the implementation of any new policies after 2002, that may have a positive or negative impact on the outcomes for children experiencing care and protection or youth justice intakes. There may have been other factors influencing later offending that this study did not measure by using only static variables, for instance individual, school or community factors that increase risk. Another limitation is the possibility that a different choice could have been made, regarding how many clusters and which variables to include in the analysis.

4.4 Conclusion

This current study supports previous studies that have shown that experiencing early childhood maltreatment and having contact with multiple systems, such as child welfare, courts and police are risks for further antisocial behaviour. Previous research has shown that there are high costs associated with crime, not just financially but also at the individual and community levels, however, there are well designed programmes available that are more cost effective in the long-term, than more punitive measures. Additionally, this study highlights that having a youth welfare or justice history does not automatically mean that an individual will be at risk for future

offending. It would be difficult to predict in advance exactly which individuals from the four clusters would continue to offend and which individuals would never offend again, and these results should be interpreted carefully.

References

Albertson, K., & Fox, C. (2008). Estimating the costs of crime in England and Wales. *Safer Communities, 7*(4), 25-33.

Allard, T., Stewart, A., Smith, C., Dennison, S., Chrzanowski, A., & Thompson, C. (2014). The monetary cost of offender trajectories: Findings from Queensland (Australia). *Australian &New Zealand Journal of Criminology, 47*(1), 81-101.

Andrews, D. A., & Bonta, J. (2010). *The psychology of criminal conduct* (5th ed.). New Providence, NJ: Lexis Nexis

Andrews, D. A., Bonta, J., & Hoge, R. D. (1990). Classification for effective rehabilitation: Rediscovering psychology, *Criminal Justice & Behavior, 17*, 19-52.

Battin, S. R., Hill, K. G., Abbott, R. D., Catalano, R. F., & Hawkins, D. (1998). The contribution of gang membership to delinquency beyond delinquent friends, *Criminology, 36*(1), 93-115.

Bender, K. (2010). Why do some maltreated youth become juvenile offenders? A call for further investigation and adaptation of youth services, *Children and Youth Services Review, 32*, 466-473.

Bowlby, J. (2005). *A secure base*. New York: Taylor & Francis Group

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by design and nature*. Cambridge MA: Harvard University Press.

Chen, W. Y., Propp, J., deLara, E., & Corvo, K. (2011). Child neglect and its association with subsequent juvenile drug and alcohol offence, *Child & Adolescent Social Work Journal, 28*(4), 273-290.

Children, Young Persons and Their Families Act (1989). Retrieved from http://www.legislation.govt.nz/act/public/1989/0024/latest/whole.html#DLM149477

Christle, C. A., Jolivette, K., & Nelson, C. M. (2005). Breaking the school to prison pipeline: Identifying school risk and protective factors for youth delinquency, *Exceptionality, 13*(2), 69-88.

Chu, C. M., Daffern, M., Thomas, S., & Lim, J. Y. (2012). Violence risk and gang affiliation in youth offenders: a recidivism study, *Psychology, Crime & Law, 18*(3), 299-315.

Cohen, M. A., & Piquero, A. R. (2009). New evidence on the monetary value of saving a high risk youth. *Journal of Quantitative Criminology, 25*, 25-49.

Cohen, M. A., Rust, R. T., & Steen, S. (2006). Prevention, crime control or cash? Public preferences towards criminal justice spending priorities. *Justice Quarterly, 23*(3), 317-335.

Connolly, M., & Masson, J. (2014). Private and public voices: Does family group conferencing privilege the voice of children and families in child welfare? *Journal of Social Welfare & Family Law, 36*(4), 403-414.

Cottle, C. C., Lee, R. J., & Heilbrun, K. (2001). The prediction of criminal recidivism in juveniles: A meta-analysis, *Criminal Justice and Behavior, 28*(3), 367-394.

Curtis, N. M., Ronan, K. R., & Borduin, C. M. (2004). Multisystemic treatment: A meta-analysis of outcome studies, *Journal of Family Psychology, 18,* 411-419.

DeGue, S., & Widom, K. S. (2009). Does out-of-home placement mediate the relationship between child maltreatment and adult criminality? *Child Maltreatment, 14*, 344-355.

Dopp, A. R., Borduin, C. M., Wagner, D. V., & Sawyer, A. M. (2014). The economic impact of multisystemic therapy through midlife: A cost-benefit analysis with serious juvenile offenders and their siblings, *Journal of Consulting and Clinical Psychology, 82*(4), 694-705.

Dubow, E. F., Huesmann, L. R., Boxer, P., & Smith, C. (2016). Childhood and adolescent risk and protective factors for violence in adulthood, *Journal of Criminal Justice, 45*, 26-31.

Farrington, D. P. (1986). Age and crime. In M. Tonry & N. Morris (Eds.), *Crime and justice: A review of research* (Vol. 7, pp. 189–250). Chicago: University of Chicago Press.

Farrington, D. P. (1998). Predictors, causes, and correlates of male youth violence, *Crime and Justice, 24*, 421-475.

Farrington, D. P., & Koegl, C. J. (2015). Monetary benefit and costs of the stop now and plan program for boys aged 6-11, based on the prevention of later offending. *Journal of Quantitative Criminology, 31,* 263-287.

Fearon, R. P., Bakermans-Kranenburg, M. J., van IJzendoorn, M., Lapsley, A. & Roisman, G. (2010). The significance for insecure attachment and disorganization in the developmentof children's externalizing behavior: A meta-analytic study, *Child Development, 81*(2), 435-456.

Fergusson, D. M., Horwood, L. J., & Nagin, D. S. (2000). Offending trajectories in a New Zealand birth cohort. *Criminology, 38*(2), 525-552.

Fergusson, D. M., Horwood, J., & Ridder, E. M. (2005). Show me a child at seven: Consequences of conduct problems in childhood for psychosocial functioning in adulthood, *Journal of Child Psychology and Psychiatry, 46*(8), 837-849.

Frick, P. J. (2012). Developmental pathways to conduct disorder: Implications for future directions in research, assessment, and treatment. *Journal of Clinical Child & Adolescent Psychology*, *41*(3), 378-389.

Frick, P. J. & Viding, E. M. (2009). Antisocial behaviour from a developmental psychopathology perspective, *Development and Psychopathology, 21*(4), 1111-1131.

Garmezy, N. (1991). Resiliency and vulnerability to adverse developmental outcomes associated with poverty, *American Behavioral Scientist, 34*(4), 416-430.

Gordon, R. A., Lahey, B. B., Kawai, E., Loeber, R., Stouthamer-Loeber, M., & Farrington, D. P. (2004). Antisocial behavior and youth gang membership: selection and socialization, *Criminology*, *42*(1), 55-88.

Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of crime.* Stanford, California: Stanford University Press.

Hawkins, J. D., Herrenkohl, T. I., Farrington, D. P., Brewer, D., Catalano, R. F., Harachi, T. W., & Cothern, L. (2000). *Predictors of youth violence. Juvenile justice bulletin.* (Department of Justice. Office of Juvenile Justice and Delinquency Prevention report). Retrieved from https://files.eric.ed.gov/fulltext/ED440196.pdf

Henggeler, S. W., & Sheidow, A. J. (2012). Empirically supported family-based treatments for conduct disorder and delinquency in adolescents, *Journal of Marital and Family Therapy*, *38*, 30-58.

Henry, D. B., Tolan, P. H., & Gorman-Smith, D. (2005). Cluster analysis in family psychology research, *Journal of Family Psychology, 19*(1), 121-132.

Herrenkohl, T. I., Maguin, E., Hill, K. G., Hawkins, J. D., Abbott, R. D., & Catalano, R. F. (2000). Developmental risk factors for youth violence, *Journal of Adolescent Health*, *26*, 176-186.

Hirschi, T., & Gottfredson, M. R. (1983). Age and the explanation of crime. *American Journal of Sociology*, *89*(3), 552-584.

Hoge, R. D. (2016). Risk, need, and responsivity in juveniles. In K. Heilbrun, D. DeMatteo, & N. E. S. Goldstein (Eds.), *APA handbook of psychology and juvenile justice* (pp. 179-195). Washington DC: American Psychological Society.

IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.

Jennings, W. G., Piquero, A. R., & Farrington, D. P. (2013). Does resting heart rate at age 18 distinguish general and violent offending up to age 50? Findings from the Cambridge study in delinquent development, *Journal of Criminal Justice, 41,* 213-219.

Johnstone, P. (2016). Emerging developments in juvenile justice: the use of intervention, diversion, and rehabilitation to break the cycle and prevent juvenile offending. *The Judicial Review,12*, 455-470.

Jonson-Reid, M., Kohl, P. L., & Drake, B. (2012). Child and adult outcomes of chronic child maltreatment. *Pediatrics, 129*(5), 839-845.

Jung, H., Herrenkohl, T. I., Lee, J. O., Hemphill, S. A., Heerde, J. A., & Skinner, M. L. (2017). Gendered pathways from child abuse to adult crime through internalizing and externalizing behaviors in childhood and adolescence, *Journal of Interpersonal Violence, 32*(18), 2724-2750.

Kioa, L. M. (2015). The proportion of youth offenders who receive an additional conviction at a five year follow up: Testing and developing an actuarial risk model for predicting long term recidivism (master's thesis). University of Canterbury, New Zealand.

Klenowski, P. M., Bell, K. J., & Dodson, K. D. (2010). An empirical evaluation of juvenile awareness programs in the United States: Can juveniles be "Scared Straight"? *Journal of Offender Rehabilitation, 49,* 254-272.

Koehler, J. A., Losel, F., Akoensi, T. D., & Humphreys, D. K. (2013). A systematic review and meta-analysis on the effects of young offender treatment programs in Europe, *Journal of Experimental Criminology, 9*(1), 19-43.

Lansford, J. E., Miller-Johnson, S., Berlin, L. J.,Dodge, K. A., Bates, J. E., & Pettit, G. S. (2007). Early physical abuse and later violent delinquency: A prospective longitudinal study. *Child Maltreatment, 12*(3), 233-245.

Lemmon, J. H. (2006). The effects of maltreatment recurrence and child welfare services on dimensions of delinquency. *Criminal Justice Review, 31*(1), 5-32.

Losel, F., & Farrington, D. P. (2012). Direct protective and buffering protective factors in the development of youth violence. *American Journal of Preventive Medicine, 43*, 8-23.

Lowenkamp, C. T., Latessa, E. J., Holsinger, A. M. (2006). The risk principle in action: What have we learned from 13,676 offenders and 97 correctional programs?, *Crime & Delinquency, 52*(1), 77-93.

Malvaso, C. G., Delfabbro, P. H., & Day, A. (2016). Risk factors that influence the maltreatment-offending association: A systematic review of prospective and longitudinal studies. *Aggression and Violent Behavior, 13,*1-15.

Maxfield, M. G., Weiler, B. L., & Widom. (2000). Comparing self-reports and official records of arrests. *Journal of Quantitative Criminology, 16*(1), 87-110.

Maxwell, G., & Morris, A. (2006). Youth justice in New Zealand: Restorative justice in practice? *Journal of Social Issues, 62*(2), 239-258.

McAra, L., & McVie, S. (2010). Youth crime and justice: Key messages from the Edinburgh Study of Youth Transitions and Crime, *Criminology & Criminal Justice, 10,* 179-209.

McAra, L., & McVie, S. (2016). Understanding youth violence: The mediating effects of gender, poverty and vulnerability, *Journal of Criminal Justice, 45*, 71-77.

McKinlay, A., James, V. L., & Grace, R. C. (2013). Development of an actuarial static risk model suitable for automatic scoring for predicting juvenile recidivism. *Legal and Criminological Psychology, 20*(2), 1-18.

Mersky, J. P., & Reynolds, A. J. (2007). Child maltreatment and violent delinquency: Disentangling main effects and subgroup effects. *Child Maltreatment, 12*(3), 246-258.

Moffitt, T. E. (1993). Adolescence-limited and life-course-persistent antisocial behaviour: A developmental taxonomy, *Psychological Review, 100*(4), 674-701.

Moffitt, T. E. (2007). A review of research on the taxonomy of life-course persistent versus adolescence-limited antisocial behaviour. In D. J. Flannery, A. T. Vazsonyi & I. D. Waldman (Eds.), *The Cambridge Handbook of Violent Behavior and Aggression* (pp. 49-74). New York: Cambridge University Press.

Moffitt, T. E., & Caspi, A. (2001). Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females, *Development and Psychopathology, 13,* 355-375.

Moffitt, T. E., Caspi, A., Dickson, N., Silva, P. A., & Stanton, W. (1996). Childhood-onset versus adolescent-onset antisocial conduct in males: Natural history from age 3 to 18. *Development and Psychopathology, 8*(2), 399-424.

Moffitt, T. E., Caspi, A., Harrington, H. & Milne, B. (2002). Males on the life-course persistent and adolescence-limited antisocial pathways: Follow-up at age 26. *Development and Psychopathology, 14*(1), 179-206.

Murray, J., & Farrington, D. P. (2010). Risk factors for conduct disorder and delinquency: Key findings from longitudinal studies, *The Canadian Journal of Psychiatry, 55*(10), 633-642.

Nagin, D. S., Farrington, D. P., & Moffitt, T. E. (1995). Life-course trajectories of different types of offenders, *Criminology, 33*(1), 111-139.

New Zealand Ministry of Justice (n.d.). *Youth Court Overview*. Retrieved December 11, 2018, from https://www.youthcourt.govt.nz/about-youth-court/overview/

Newsome, J., & Cullen, F. T. (2017). The risk-need-responsivity model revisited: Using biosocial criminology to enhance offender rehabilitation, *Criminal Justice and Behavior, 44*(8), 1030-1049.

Piquero, A. R., Farrington, D. P., & Blumstein, A. (2003). The criminal career paradigm. *Crime and Justice, 30,* 359-506.

Piquero, A. R., Paternoster, R., Pogarsky, G., & Loughan, T. (2011). Elaborating the individual difference component in deterrence theory, *Annual Review of Law and Social Science, 7*, 335-360.

Petrosino, A., Turpin-Petrosino, C., & Buehler, J. (2003). Scared Straight and other juvenile awareness programs for preventing juvenile delinquency: A systematic review of the randomized experimental evidence. *The Annals of the American Academy of Political and Social Science, 89,* 41-62.

Petrosino, A., Turpin-Petrosino, C., Hollis-Peel, M. E., & Lavenberg, J. G. (2013). Scared straight and other juvenile awareness programs for preventing juvenile delinquency: A systematic review, *Cochrane Database of Systematic Reviews, 4*. DOI: 10.1002/14651858.CD002796.pub2.

Portnoy, J., Farrington, D. P. (2015). Resting heart rate and antisocial behaviour: An updated systematic review and meta-analysis, *Aggression and Violent Behavior, 22*, 33-45.

Raine, A., Portnoy, J., Liu, J., Mahoomed, T. & Hibbeln, J. R. (2015). Reduction in behavior problems with omega-3 supplementation in children aged 8-16 years: A randomized, double-blind, placebo-controlled, stratified, parallel-group trial, *Journal of Child Psychology and Psychiatry, 56*, 509-520.

Rivera, B., & Widom, C. S. (1990). Childhood victimization and violent offending. *Violence and Victims, 5*(1), 19-35.

Roper, T., & Thompson, A. (2006). *Estimating the costs of crime in New Zealand in 2003/04.* (New Zealand Treasury working paper 06/04). Wellington, New Zealand. Retrieved from https://treasury.govt.nz/sites/default/files/2007-09/twp06-04.pdf

Ryan, J., Hong, J. S., Hertz, D., & Hernandez, P. M. (2010). Kinship foster care and the risk of juvenile delinquency. *Children and Youth Services Review, 32*(12), 1823-1830.

Ryan, J., & Testa, M. F. (2005). Child maltreatment and juvenile delinquency: Investigating the role of placement and placement instability. *Children and Youth Services Review, 27*(3), 227-249.

Sampson, R. J., & Laub, J. H. (1993). *Crime in the making: Pathways and turning points through life.* Cambridge, Mass.: Harvard University Press.

Sampson, R. J., Laub, J. H. (2003). Life-course desisters? Trajectories of crime among delinquent boys followed to age 70*, *Criminology, 41*(3), 555-592.

Schoenthaler, S. J., Amos, S., Doraz, W., Kelly, M., Muedeking, G., & Wakefield, J. (1997). The effect of randomized vitamin-mineral supplementation on violent and non-violent antisocial behavior among incarcerated juveniles, *Journal of Nutritional & Environmental Medicine, 7*, 343-352.

Scott, S. (2015). Oppositional and conduct disorders. In A. Thapar, D. Pine, J. Leckman, S. Scott, M. Snowling & E. Taylor (Eds.), *Rutter's Child & Adolescent Psychiatry* (6th ed.), New York: Wiley Blackwell.

Scott, S., Briskman, J., Woolgar, M., Humayun, S., & O'Connor, T. G. (2011). Attachment in adolescence: Overlap with parenting and unique prediction of behavioural adjustment, *Journal of Child Psychology and Psychiatry, 52*(10), 1052-1062.

Thornberry, T., Krohn, M., Lizotte, A., Smith, C., & Tobin, K. (2003). *Gangs and delinquency in developmental perspective*. New York: Cambridge University Press.

Tonry, M. (2015). The cost-benefit fog may be clearing: Prisoners and their kids suffer too. *Criminology & Public Policy, 14*, 653-671.

Viljoen, J. L., Brodersen, E., Shaffer, C., & McMahon, R. J. (2016). Risk reduction interventions for adolescent offenders. In K. Heilbrun, D. DeMatteo, & N. E. S. Goldstein (Eds.), *APA handbook of psychology and juvenile justice* (pp. 179-195). Washington DC: American Psychological Society.

Walters, G. D. (2011). The latent structure of life-course-persistent antisocial behaviour: Is Moffitt's developmental taxonomy a true taxonomy?, *Journal of Consulting and Clinical Psychology, 79*(1), 96-105.

Welsh, B. C., Loeber, R., Stevens, B. R., Stouthamer-Loeber, M., Cohen, M. A., & Farrington, D. P. (2008). Costs of juvenile crime in urban areas. *Youth Violence and Juvenile Justice, 6*(1), 3-27.

Wickramasekera, N., Wright, J., Elsey, H., Murray, J., & Tubeuf, S. (2015). Cost of crime: A systematic review. *Journal of Criminal Justice, 43*(3), 218-228.

Widom, C. S., & Ames, A. M. (1994). Criminal consequences of childhood sexual victimization. *Child Abuse & Neglect, 18*(4), 303-318.

Widom, C. S., & Massey, C. (2015). A prospective examination of whether childhood sexual abuse predicts subsequent sexual offending. *JAMA Pediatrics.* doi:10.1001/jamapediatrics.2014.3357

Widom, C. S., & Maxfield, M. G. (1996). A prospective examination of risk for violence among abused and neglected children, *Annals of the New York Academy of Sciences, 794*(1), 224-237.

Wikstrom, P. H., & Loeber, R. (2000). Do disadvantaged neighborhoods cause well-adjusted children to become adolescent delinquents? A study of male juvenile serious offending, individual risk and protective factors, and neighborhood context, *Criminology, 38*(4), 1109-1142.

Zaalberg, A., Nijman, H., Bulten, E., Stroosma, L. & van der Staak, C. (2010). Effects of nutritional supplements on aggression, rule-breaking, and psychopathology among young adult prisoners, *Aggressive Behavior, 36*, 117-126.

Appendices

Appendix A – Approval Letter from the Human Ethics Committee

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2017/75/LR

13 September 2017

Belinda Seaward
Psychology
UNIVERSITY OF CANTERBURY

Dear Belinda

Thank you for submitting your low risk application to the Human Ethics Committee for the research proposal titled "A Latent Class Analysis of Youth Welfare and Justice Histories Linked to Later Offending".

I am pleased to advise that this application has been reviewed and approved; **subject to the following:**

- *Once approval for you to access the data used in the previous research from Oranga Tamariki (MVCOT), Statistics NZ, and the NZ Police has been received please send copies of the approvals through to the Committee.*
- *Please can you also forward the response from Liz Brown once receved.*

With best wishes for your project.

Yours sincerely

pp. R. Robinson

Associate Professor Jane Maidment
Chair, Human Ethics Committee

Appendix B – Approval Letter from the Ministry of Social Development's Research Access Committee

ORANGA TAMARIKI
Ministry for Vulnerable Children

15 November 2017

Department of Psychology
University of Canterbury
Christchurch
NEW ZEALAND

Tēnā koe Belinda,

LETTER OF RESEARCH APPROVAL
"A latent class analysis of youth welfare and justice histories linked to later offending"

Thank you for submitting your research access application to the Ministry for Vulnerable Children, Oranga Tamariki Research Access Committee (RAC).

I am pleased to inform you that your research access application for "A latent class analysis of youth welfare and justice histories linked to later offending" has been given full approval.

The RAC asks that you complete and return the Deed of Confidentiality given you will be using Ministry data for your project. The RAC also asks that you provide a summary of your research to the Ministry upon completion.

There are no additional conditions or requirements. Your research must maintain fidelity with your RAC application and the University of Canterbury ethics approval. Please notify us if there are significant changes.

Please also note that the RAC remains a shared Ministry of Social Development / Ministry for Vulnerable Children, Oranga Tamariki service for the time being.

Should you have any concerns or questions about the research approval, or for other research related matters, please continue to contact the RAC's Research Access Coordinator.

Good luck with your research.

Nāku noa, nā,

Dr James McIlraith

Research Access Coordinator (Acting)
Senior Analyst | Research and Evaluation

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Appendix C – Letter of Support from the Ngāi Tahu Consultation and Engagement Group

Ngāi Tahu Consultation and Engagement Group

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

02/10/2017

Tēnā koe, Belinda

RE: A latent class analysis of youth welfare and justice histories linked to later offending.

This letter is written on behalf of the Ngāi Tahu Consultation and Engagement Group. I/We have read and considered your proposal and acknowledge that this is a worthwhile and very interesting project there have been no issues identified.

It is well considered and the researcher is clear about how they ought to take participants' (cultural) needs into account if and when applicable.

Thank you for engaging with the Māori consultation process. This will strengthen your research proposal, support the University's Strategy for Māori Development, and increase the likelihood of success with external engagement. It will also increase the likelihood that the outcomes of your research will be of benefit to Māori communities. We wish you all the best with your current project and look forward to hearing about future research plans.

The Ngāi Tahu Consultation and Engagement Group would appreciate a summary of your findings on completion of the current project. Please feel free to contact me if you have any questions.

Ngā mihi
Nigel Harris

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